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IN THIS ISSUE

THE paper "Tonsillectomy and Respiratory Illness in the Populations of Two Communities in New York State" by Jane Coulter Mertz, presents data on the respiratory illness experience of two groups of persons—those with tonsils present and those with tonsils removed—who were observed for three school years, September, 1946 to June, 1949.

The frequency of tonsillectomy is shown by the occupational class of the head of the household and by the age and sex of the persons under observation.

The group with tonsils present and the group with tonsils removed were similar with respect to the frequency and severity of attacks of acute respiratory illness.

• • •

Tonsillectomy is now one of the most frequent operative procedures employed in medicine. The article "Changes in the Risk of Tonsillectomy Over the Period 1880-1949" by Jean Downes, describes the increase in popularity of tonsillectomy over a period of sixty-nine years.

The population included in this report consists of the members of the families in Pleasantville and Mt. Kisco, New York, who participated in a study of acute respiratory illness made in those two communities.

The risk of tonsillectomy is shown for three periods of time: (1) for persons born before 1910; (2) for persons born during the period 1910-1920; and (3) for those born in the years 1930-1948. The data presented indicate clearly a marked increase in the frequency of tonsillectomy after 1910.

• • •

The paper "Characteristics of Psychoneurotic Patients and

Their Families as Revealed in a General Morbidity Study," by Jean Downes and Katherine Simon, presents a description of psychoneurotic patients and their families living in the Eastern Health District of Baltimore. Ninety families in which there was a case of psychoneurosis were compared with a total of 828 families in which one or more family members had some form of chronic disease.

While there was little difference between the two groups of families with respect to social environmental factors, they were found to differ significantly in their illness experience.

• • •

Differences among states in rejection rates for selective service registrants are found to be correlated positively with mortality and negatively with per capita expenditures for education by Charles A. Ullman in "A Note on Predicting Manpower Resources from Health and Educational Data."

• • •

In the Indianapolis Study data were collected concerning the occupational and educational status not only of the couples interviewed but also of the parents of these couples. These data form the bases for an article in this issue by John F. Kantner and Clyde V. Kiser, "The Interrelation of Fertility, Fertility Planning, and Intergenerational Social Mobility." This is the twenty-second of a series of reports appearing in the *Quarterly* under the general title "Social and Psychological Factors Affecting Fertility."

TONSILLECTOMY AND RESPIRATORY ILLNESS IN THE POPULATIONS OF TWO COMMUNITIES IN NEW YORK STATE

JANE COULTER MERTZ¹

IN 1868, Mayer of Copenhagen introduced the operation for the removal of the adenoid. Since that time the tonsil and adenoid operation has increased in frequency until it is now one of the most common surgical operations (1). Kaiser, in commenting on the frequency of the operation, said "Whatever influences may have been responsible for bringing about the present attitude toward the tonsils and adenoids, it must be recognized that surgery of the tonsils has been widely accepted as both a therapeutic and a prophylactic procedure" (2).

The study of acute respiratory illness that was conducted in two communities, Pleasantville and Mt. Kisco, in Westchester County, New York, from September, 1946 to June, 1949 included records on tonsillectomies in those populations. The purpose of this paper is to present data on the respiratory illness experience of persons with tonsils present and of persons with tonsils removed.

DATA AND METHOD OF STUDY

The data and method of the study of respiratory illness in the two communities in Westchester County, New York, have been fully described in previous reports (3, 4). Briefly, the periodic survey of families for the purpose of collection of illness records was the method employed in this study. All families in which there were one or more children attending grade school or high school in each of the two communities were included. These families were visited every twenty-eight days during three school years, September to June, 1946-1949. On each visit to the family, inquiry was made about acute respiratory illnesses which had occurred among their members during the past four weeks.

The weekly incidence of acute respiratory illness was fairly similar in both communities in each study year (3, 4). In this

¹ From the Milbank Memorial Fund. This is the tenth in a series of papers dealing with acute respiratory illness.

analysis, therefore, the morbidity experience over the three years has been combined for each community.

A description of the two communities also has been presented in previous reports (3, 4). The mean number of families visited during the three years of the study was 530 in Pleasantville and 570 in Mt. Kisco. The two communities were similar with respect to the age distribution of the study population and the median size of family. The data presented in this report represent the combined experience of the two communities.

The population is composed of the persons in both communities counted in each year that they were observed. Thus the rates obtained represent an average nine-month incidence over three school years.

FREQUENCY OF TONSILLECTOMY

On the initial visit to the family, inquiry was made concerning the presence or absence of tonsils for each person in the household. The age at which tonsillectomy occurred was recorded for persons with tonsils removed. Tonsillectomies which occurred during the study were also recorded. No record was made of adenoidectomies unless the tonsils were also removed.

Tonsillectomy by Occupational Class of Head of Household. Figure 1 and Appendix Table 1 show the proportion of persons with tonsils removed, classified by age and the occupational class of the head of the household.² Two hundred and seventeen persons who had a tonsillectomy during the study were excluded in the particular year in which the tonsillectomy occurred. Two hundred and three persons or 3 per cent of the 6,374 total persons who were observed at some time during the three years of the study have been excluded because it was unknown whether their tonsils were present or removed. From the data presented in the left section of Figure 1, it appears that economic status had an effect in determining the occurrence of tonsillectomy. At each age a greater proportion of the total persons in the professional and managerial class had their tonsils removed than in either the clerical and skilled or semi-skilled

² Coding of occupational class was based upon the Alphabetical Index of Occupations and Industries. United States Department of Commerce, Bureau of the Census, Sixteenth Census of the United States, 1940.

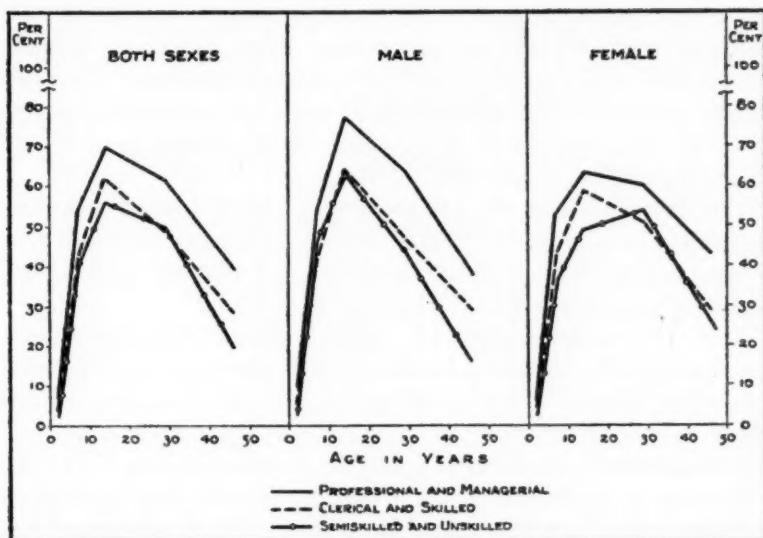


Fig. 1. Per cent of persons with tonsils removed classified by age, sex, and the occupational class of the head of the household. Pleasantville and Mt. Kisco, 1946-1949.

and unskilled classes.⁸ In a study of tonsillectomies in two counties in Florida and one in Missouri, Collins also reported differences in the proportion of children in the different occupational classes who had their tonsils removed. He noted that "The rates in the unskilled group are generally one-third to one-half of what they are in the professional and salaried class" (5). In the Westchester study the rates for children in the semi-skilled and unskilled class were three-quarters of what they were for children whose fathers were in the professional and managerial class.

Age. The left section of Figure 1 also shows the proportion of persons at different ages who had had a tonsillectomy. The proportion of tonsillectomized children increased with age from

⁸ When the data for persons of all ages in the clerical and skilled and semi-skilled and unskilled classes combined were compared with data for the professional and managerial class, the difference in the proportion of persons with tonsils removed was significant at the .05 level of confidence. The standard error of the difference between per cents was computed and the value for "t" was obtained by computing the ratio of the difference between per cents to the standard error of the difference between the per cents. The formula is:

$$sd = \sqrt{PQ \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}$$

$$t = \frac{10.9225}{.8619} = 12.6726$$

less than 8 per cent in the 0-4 year-age group to from 56 to 70 per cent in the 10-18 year-age group. After age 18 the proportion of the total persons who had had a tonsillectomy decreased as age increased. Forty-nine to 62 per cent of the adults aged 19 to 39 and only 20 to 40 per cent of the adults aged 40 and older had had a tonsillectomy.

The data shown in the left section of Figure 1 corroborate the fact that the removal of tonsils has become more frequent than in past years. The highest proportion of persons with tonsils removed was in the 10-18 year-age group.

Sex. The center section of Figure 1 shows the proportion of males at specific ages who had had a tonsillectomy and the right section of Figure 1 shows the same data for females. In this study a greater proportion of male children in each occupational class had tonsillectomies than female children. This sex difference is especially marked in the 10-18 year-age group. Seventy-seven per cent of the males in the professional and managerial class compared with 63 per cent of the females had had tonsillectomies; 64 per cent and 59 per cent, respectively, in the clerical and skilled class; and 63 per cent and 49 per cent, respectively, in the semi-skilled and unskilled class. This sex difference among children in the frequency of tonsillectomy has been noted in other studies of school-aged children (6-9). Among adults a slightly greater proportion of the females in the two communities in Westchester County had had tonsillectomies. When all ages are combined, however, the difference between the sexes in the proportion of persons which had a tonsillectomy disappears. This is true of those in each occupational class.⁴

INCIDENCE OF ACUTE RESPIRATORY ILLNESS

Acute respiratory illnesses presented in this report include head colds or coryza, colds with sore throat, tonsillitis and septic sore throat, colds with chest involvement such as tracheitis and bronchitis, and influenza or grippe. Figure 2 shows the distri-

Per Cent With Tonsillectomy

	<i>Male</i>	<i>Female</i>
⁴ Professional and Managerial	51.8	50.9
Clerical and Skilled	41.1	42.4
Semi-Skilled and Unskilled	37.7	40.1

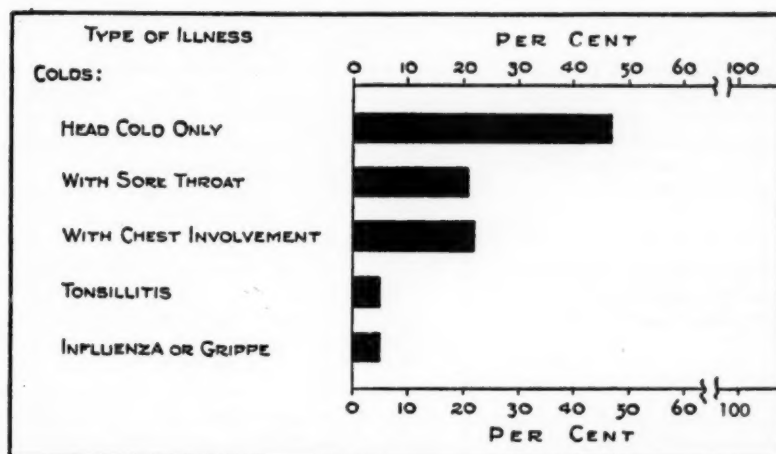


Fig. 2. Distribution of acute respiratory illnesses classified by type of illness. Pleasantville and Mt. Kisco, September to June, 1946-1949.

bution of these reported illnesses in order of their severity. Head colds accounted for 47 per cent of the total illness; colds with sore throat, 21 per cent; colds with chest involvement, 22 per cent; tonsillitis and septic sore throat, 5 per cent; and influenza or grippe, 5 per cent. Cases of asthma, intestinal influenza or grippe, tonsillectomies and mastoidectomies have been excluded.

Nearly 50 per cent of the children under 19 years of age in the Pleasantville and Mt. Kisco families had had a tonsillectomy. Kaiser found a similar proportion of tonsillectomized children in his studies and stated his skepticism of such widespread tonsillectomy saying, "Where this procedure is applied to 50 per cent of the children during their school years, it seems reasonable to question whether the tonsils can be incriminated in such a high percentage of children and whether surgical treatment of the tonsils in these children contributes anything to their health" (2).

In order to study the association of tonsillectomy and the incidence of acute respiratory illness, the population observed in the Westchester study was divided into two groups: (1) those whose tonsils were removed before the study began, and (2) those who had no tonsillectomy before or during the study. Table 1 and Appendix Table 2 show the incidence of

OCCUPATIONAL CLASS OF HEAD OF HOUSEHOLD	MALE		FEMALE	
	Tonsils Present	Tonsils Removed	Tonsils Present	Tonsils Removed
Rate per 1,000 Population				
AGE 5-9				
Professional and Managerial	2,537	2,647	2,614	2,988
Clerical and Skilled	2,124	2,171	2,092	2,160
Semiskilled and Unskilled	2,019	1,820	1,778	2,110
AGE 10-18				
Professional and Managerial	1,389	1,654	1,593	1,889
Clerical and Skilled	1,201	1,474	1,333	1,856
Semiskilled and Unskilled	838	1,125	1,173	1,329
AGE 19-39				
Professional and Managerial	1,050	1,136	1,451	1,598
Clerical and Skilled	653	755	1,104	1,235
Semiskilled and Unskilled	488	608	890	1,013
AGE 40+				
Professional and Managerial	738	1,042	934	1,412
Clerical and Skilled	654	890	940	1,282
Semiskilled and Unskilled	400	650	736	1,054

Table 1. Incidence of acute respiratory illness among persons classified by age, sex, occupational class of the head of the household, and whether tonsils were present or removed. Pleasantville and Mt. Kisco, 1946-1949.

acute respiratory illness by age, sex, and the occupational class of the head of the household for persons with tonsils present and persons with tonsils removed.⁵ In each occupational class, sex, and age group under 40 the incidence of reported illness was similar among persons with tonsils present and persons with tonsils removed. Among adults aged 40 and over, persons with tonsils removed had a higher incidence of respiratory illness than persons with tonsils present.

INCIDENCE OF TONSILLITIS AND SEPTIC SORE THROAT

In both Pleasantville and Mt. Kisco, tonsillitis and septic

⁵ Persons under 5 years of age have been omitted from these data because less than 8 per cent of them had had a tonsillectomy.

OCCUPATIONAL CLASS OF THE HEAD OF THE HOUSEHOLD	TONSILS PRESENT	TONSILS REMOVED	RATIO	
			TONSILS PRESENT	TONSILS REMOVED
Professional and Managerial Clerical and Skilled Semiskilled and Unskilled	Rate Per 1,000 Population			
	AGE 5-18			
	90.8	54.7	1.66	
	87.7	48.9	1.79	
	48.8	28.6	1.71	
	AGE 19+			
	14.3	38.3	0.37	
	24.2	23.3	1.04	
	20.6	19.1	1.08	

Table 2. Incidence of tonsillitis and septic sore throat among persons classified by the occupational class of the head of the household, age, and whether tonsils were present or removed. Pleasantville and Mt. Kisco, 1946-1949.

sore throat accounted for 3 per cent of the total acute respiratory illness reported for persons 5 years of age and over during the three years of the study. The incidence of tonsillitis and septic sore throat is shown in the first two columns of Table 2 and in Appendix Table 3 for persons classified by age, the occupational class of the head of the household, and whether tonsils were present or removed. The third column of Table 2 shows the ratio of the incidence among persons with tonsils present to the incidence among persons with tonsils removed. In the 5 to 18 year-age group, children with tonsils present had from 66 to 79 per cent more tonsillitis and septic sore throat than did children with tonsils removed. Among adults aged 19 and over the incidence of tonsillitis and septic sore throat was similar in the tonsil-present and the tonsil-removed groups with the exception of adults in the professional and managerial class.

INCIDENCE OF ACUTE RESPIRATORY ILLNESS BY SELECTED INDICES OF SEVERITY

Illnesses were classified according to disability to study whether the severity of attacks of acute respiratory illness dif-

OCCUPATIONAL CLASS OF HEAD OF HOUSEHOLD	MALE		FEMALE	
	Tonsils Present	Tonsils Removed	Tonsils Present	Tonsils Removed
Rate per 1,000 Population				
AGE 5-9				
Professional and Managerial	1,920	1,932	1,958	2,270
Clerical and Skilled	1,534	1,530	1,444	1,472
Semiskilled and Unskilled	1,212	1,236	1,111	1,500
AGE 10-18				
Professional and Managerial	893	1,031	1,036	1,290
Clerical and Skilled	728	872	847	1,048
Semiskilled and Unskilled	593	646	636	746
AGE 19-39				
Professional and Managerial	322	399	388	528
Clerical and Skilled	208	255	401	450
Semiskilled and Unskilled	188	186	289	291
AGE 40+				
Professional and Managerial	284	382	336	403
Clerical and Skilled	210	356	292	373
Semiskilled and Unskilled	120	300	271	280

Table 3. Incidence of disabling attacks of acute respiratory illness among persons classified by age, sex, the occupational class of the head of the household, and whether tonsils were present or removed. Pleasantville and Mt. Kisco, 1946-1949.

ferred between the tonsil-present and tonsil-removed groups. A disabling illness was defined as an illness which caused an interruption in usual daily work or activities.

Table 3 and Appendix Table 4 show the incidence of disabling acute respiratory illness classified by age, sex, the occupational class of the head of the household, and the presence or absence of tonsils. In each occupational class, sex, and age group under 40 the incidence of disabling illness was similar among persons with tonsils removed and those with tonsils present. The similarity was especially marked in the 5 to 9 year-age group. After age 40, males with tonsils removed had

OCCUPATIONAL CLASS OF HEAD OF HOUSEHOLD	TONSILS PRESENT	TONSILS REMOVED
	Rate Per 1,000 Population	
	AGE 5-9	
Professional and Managerial	10,092	11,213
Clerical and Skilled	8,865	7,870
Semiskilled and Unskilled	6,641	9,351
	AGE 10-18	
Professional and Managerial	4,029	4,746
Clerical and Skilled	3,358	3,970
Semiskilled and Unskilled	2,339	2,734
	AGE 19+	
Professional and Managerial	1,645	2,073
Clerical and Skilled	1,572	2,021
Semiskilled and Unskilled	1,123	658

Table 4. Incidence of disabled days of acute respiratory illness among persons classified by age, the occupational class of the head of the household, and whether tonsils were present or removed. Pleasantville and Mt. Kisco, 1946-1949.

a higher incidence of disabling illness. Among females aged 40 and over the incidence of disabling illness among persons with tonsils present and persons with tonsils removed was more nearly similar.

It may be that the presence or absence of tonsils may affect the duration of disabling illness. Table 4 and Appendix Table 5 show the incidence of disabling days of acute respiratory illness for persons with tonsils present and persons with tonsils removed, classified by age and the occupational class of the head of the household. There was a similarity in the incidence of disabling days for the tonsil-present and tonsil-removed groups at each age. This was true of the three occupational classes. Persons with tonsils removed generally had both an incidence of disabling illness and an incidence of disabling days similar to that noted for the tonsil-present group.

Gafafer made two studies of adults during 1929 and 1930 in order to determine the association between the presence or absence of tonsils and the severity of attacks of upper respiratory

Table 5. Frequency of certain indices of severity in attacks of acute respiratory illness among adults.¹

INDEX OF SEVERITY	TONSILS PRESENT			TONSILS REMOVED		
	Pleasantville and Mt. Kisco ²	Gafafer No. 1 ³	Gafafer No. 2 ⁴	Pleasantville and Mt. Kisco ²	Gafafer No. 1 ³	Gafafer No. 2 ⁴
	Per Cent					
Confined to Bed	23.8	12.0	12.3	24.3	14.6	14.3
Aching	25.5	15.6	15.4	27.0	13.9	14.1
Fever	18.2	22.1	22.2	18.7	23.5	20.1
Duration 10+ Days	40.6	53.6	56.5	41.2	58.9	61.5
TOTAL NUMBER OF CASES	3,265	276	324	3,421	156	377

¹ The Gafafer studies include attacks of upper respiratory disease (common cold with the symptoms of coryza, cough, and sore throat. The Pleasantville-Mt. Kisco study includes coryza and illnesses with sore throat or chest involvement, such as tracheitis, bronchitis, and cough.

² Based on 6,950 adults aged 19+ (3,966 having tonsils present and 2,984 having tonsils absent) observed from September to June, 1946-1949.

³ Based on 179 adults aged 17-48 (123 having tonsils present and 56 having tonsils absent) observed from September, 1929 to June, 1930.

⁴ Based on 275 adults aged 17-59 (138 having tonsils present and 137 having tonsils absent) observed from September, 1929 to June, 1930.

illness (the common cold). He selected four indices of severity: in bed, general aching, fever, and duration of ten or more days (10, 11). Table 5 shows the proportion of the total cases of acute respiratory illness among adults which were accompanied by these indices of severity for the Westchester study and Gafafer's two studies. The proportion of cases confined to bed, with general aching, with fever, and with duration of 10+ days are very similar between the tonsil-present and tonsil-removed groups in both the Westchester study and those made by Gafafer.

Gafafer found that "The group with tonsils and adenoids and the group without tonsils and adenoids presented no significant difference with respect to (1) frequency, (2) severity, or (3) type of attack of disease of the upper respiratory tract (common cold)" (10, 11). Kaiser's conclusion after consideration of the data from a ten-year follow-up study of tonsillectomized children was "Acute head colds and otitis media, though definitely lessened over a three-year period, are not essentially influenced over a ten-year follow-up period" (12). In the study in Pleasantville and Mt. Kisco the incidence of respiratory illness among persons with tonsils present and persons with tonsils removed was similar for the two groups of persons for each sex and in each occupational class up to age 40. After age 40 persons with tonsils removed had a higher incidence of acute respiratory illness when compared to persons whose tonsils had not been removed.

SUMMARY

This paper has presented data on the incidence of acute respiratory illness in two groups of persons, those with tonsils present and those with tonsils removed, who were observed in two communities in Westchester County, New York, for three school years, September to June, 1946-1949.

The frequency of tonsillectomy was shown by the occupational class of the head of the household, and by the age and sex of the persons under observation. At each age a greater proportion of the total persons in the professional and managerial class had had their tonsils removed than in either the clerical and skilled or semi-skilled and unskilled classes. The

proportion of tonsillectomized children increased with age up to 18 years. After age 18 the proportion of the total persons who had had a tonsillectomy decreased as age increased. In the 10 to 18 year-age group, from 56 to 70 per cent of the children had had their tonsils removed. The data corroborate the fact that the removal of tonsils has become more frequent than in past years. In this study a greater proportion of male children in each occupational class had had tonsillectomies than female children. This sex difference among children in the frequency of tonsillectomy has been noted in other studies of school-aged children.

In each occupational class, sex, and age group under 40 the incidence of acute respiratory illness was similar among persons with tonsils present and persons with tonsils removed. After age 40 the incidence of illness among persons with tonsils removed was higher than for persons with tonsils present.

The incidence of tonsillitis and septic sore throat was from 66 to 79 per cent higher among children 5-18 with tonsils present compared to children of the same age with tonsils removed. Among adults aged 19 and over the incidence of tonsillitis and septic sore throat was similar in the tonsil-present and tonsil-removed groups with the exception of adults in the professional and managerial class.

In each occupational class, sex, and age group under 40 the incidence of disabling acute respiratory illness was similar among persons whose tonsils were removed and persons with tonsils present. After age 40, males with tonsils removed had a higher incidence of disabling illness. Among females aged 40 and over the incidence of disabling illness among persons with tonsils present and persons with tonsils removed was more nearly similar.

Among adults the severity of respiratory illness was similar for persons with tonsils present and persons with tonsils removed. Four indices of severity were used: in bed, general aching, fever, and duration of ten or more days. These indices of severity were similar in frequency between the tonsil-present and tonsil-removed groups in the Westchester study and between the two groups in two studies reported upon by Gafafer.

ACKNOWLEDGMENTS

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An especial acknowledgment is made to the families in Pleasantville and Mt. Kisco who participated in the study.

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Appendix Table 1. Population with tonsils removed, classified by the occupational class of the head of the household, and by sex and age.^{1,2} Pleasantville and Mt. Kisco, 1946-1949.

AGE IN YEARS AND SEX	OCCUPATIONAL CLASS OF THE HEAD OF THE HOUSEHOLD							
	Professional and Managerial			Clerical and Skilled			Semi-Skilled and Unskilled	
	Total	Tonsils Removed	Per Cent Removed	Total	Tonsils Removed	Per Cent Removed	Total	Tonsils Removed
<i>Both Sexes</i>								
All Ages	5,573	2,860	51.3	3,898	1,627	41.7	3,469	1,349
0-4	496	37	7.5	346	15	4.3	275	5
5-9	868	465	53.6	526	223	42.4	419	171
10-18	1,248	869	69.6	932	574	61.6	880	493
19-39	1,365	846	62.0	1,035	510	49.3	1,020	507
40+	1,596	643	40.3	1,059	305	28.8	875	173
<i>Male</i>								
All Ages	2,661	1,379	51.8	1,959	805	41.1	1,715	646
0-4	238	22	9.2	192	9	4.7	144	3
5-9	409	221	54.0	278	117	42.1	193	89
10-18	576	445	77.3	473	304	64.3	447	280
19-39	563	361	64.1	448	212	47.3	444	194
40+	875	330	37.7	568	163	28.7	487	80
<i>Female</i>								
All Ages	2,912	1,481	50.9	1,939	822	42.4	1,754	703
0-4	258	15	5.8	154	6	3.9	131	2
5-9	459	244	53.2	248	106	42.7	226	82
10-18	672	424	63.1	459	270	58.8	433	213
19-39	802	485	60.5	587	298	50.8	576	313
40+	721	313	43.4	491	142	28.9	388	93

¹ Excludes 44 persons of unknown age.

² Excludes 267 persons unknown as to tonsillectomy, 255 of whom were in the 19+ age group. These persons were counted as exclusions in each year they were observed.

Appendix Table 2. Number of acute respiratory illnesses among persons classified by age, sex, occupational class of the head of the household, and whether tonsils were present or removed. Pleasantville and Mt. Kisco, 1946-1949.

OCCUPATIONAL CLASS OF HEAD OF HOUSEHOLD	MALE		FEMALE	
	Tonsils Present	Tonsils Removed	Tonsils Present	Tonsils Removed
AGE 5-9				
Professional and Managerial	477	585	562	729
Clerical and Skilled	342	254	297	229
Semiskilled and Unskilled	210	162	256	173
AGE 10-18				
Professional and Managerial	182	736	395	801
Clerical and Skilled	203	448	252	501
Semiskilled and Unskilled	140	315	258	283
AGE 19-39				
Professional and Managerial	212	410	460	775
Clerical and Skilled	154	160	319	368
Semiskilled and Unskilled	122	118	234	317
AGE 40+				
Professional and Managerial	402	344	381	442
Clerical and Skilled	265	145	328	182
Semiskilled and Unskilled	163	52	217	98

Appendix Table 3. Number of attacks of tonsillitis and septic sore throat among persons, classified by the occupational class of the head of the household, age, and whether tonsils were present or removed. Pleasantville and Mt. Kisco, 1946-1949.

OCCUPATIONAL CLASS OF HEAD OF HOUSEHOLD	TONSILS PRESENT	TONSILS REMOVED
AGE 5-18		
Professional and Managerial	71	73
Clerical and Skilled	58	39
Semiskilled and Unskilled	31	19
AGE 19+		
Professional and Managerial	21	57
Clerical and Skilled	31	19
Semiskilled and Unskilled	25	13

OCCUPATIONAL CLASS OF HEAD OF HOUSEHOLD	MALE		FEMALE	
	Tonsils Present	Tonsils Removed	Tonsils Present	Tonsils Removed
AGE 5-9				
Professional and Managerial	361	427	421	554
Clerical and Skilled	247	179	205	156
Semiskilled and Unskilled	126	110	160	123
AGE 10-18				
Professional and Managerial	117	459	257	547
Clerical and Skilled	123	265	160	283
Semiskilled and Unskilled	99	181	140	159
AGE 19-39				
Professional and Managerial	65	144	123	256
Clerical and Skilled	49	54	116	134
Semiskilled and Unskilled	47	36	76	91
AGE 40+				
Professional and Managerial	155	126	137	126
Clerical and Skilled	85	58	102	53
Semiskilled and Unskilled	49	24	80	26

Appendix Table 4. Disabling attacks of acute respiratory illness among persons classified by age, sex, occupational class of the head of the household, and whether tonsils were present or removed. Pleasantville and Mt. Kisco, 1946-1949.

OCCUPATIONAL CLASS OF HEAD OF HOUSEHOLD	DISABLED DAYS	
	Tonsils Present	Tonsils Removed
	AGE 5-9	
Professional and Managerial	4,067	5,214
Clerical and Skilled	2,686	1,755
Semiskilled and Unskilled	1,647	1,599
	AGE 10-18	
Professional and Managerial	1,527	4,124
Clerical and Skilled	1,202	2,279
Semiskilled and Unskilled	905	1,348
	AGE 19+	
Professional and Managerial	2,422	3,086
Clerical and Skilled	2,010	1,647
Semiskilled and Unskilled	1,364	898

Appendix Table 5. Disabled days of acute respiratory illness among persons classified by age, the occupational class of the head of the household, and whether tonsils were present or removed. Pleasantville and Mt. Kisco, 1946-1949.

CHANGES IN THE RISK OF TONSILLECTOMY OVER THE PERIOD 1880-1949

JEAN DOWNES¹

IN 1928, Collins published a bulletin "An Epidemiological and Statistical Study of Tonsillitis" (1). The bulletin included data on tonsillectomies. In the introduction to the bulletin, Sydenstricker made the following comments concerning some of the findings reported by Collins: ". . . There is an apparent association of diseased tonsils with the frequency of other respiratory diseases (not causes of death) among children, with illnesses from rheumatism, heart disease, cervical adenitis, ear conditions and diphtheria. Tonsillectomy which attained its highest popularity a few years ago and which is now universal, although applied perhaps with increasing discrimination, while removing the specific diseased condition and presumably preventing some of the associated conditions already referred to, apparently does not affect the subsequent incidence of measles, whooping cough and mumps; on the contrary, for some as yet unexplained reason, the incidence of these infections was observed to be somewhat greater among children whose tonsils had been removed than among those who had not had tonsillectomy" (1).

These comments by Sydenstricker were made somewhat more than twenty years ago and it is of interest to know whether, in the meantime, the popularity of tonsillectomy has increased or decreased. The purpose of this paper is to show the change in the risk of tonsillectomy over the period 1880-1949.

DATA AND METHOD OF STUDY

The data included in this report are drawn from information collected in a study of acute respiratory illness which was conducted over a period of three school years, September, 1946-May, 1949, in two communities, Pleasantville and Mt. Kisco in Westchester County, New York (2). The population consisted of members of virtually all families in each community in which

¹ From the Milbank Memorial Fund. This is the eleventh in a series of papers dealing with a study of respiratory illness.

there was one or more children attending grade school or high school.²

On the first visit to the family, information was sought for each member of the family concerning the presence or absence of tonsils. If tonsils had been removed a record was obtained as to the person's age when the tonsillectomy was performed. Since most of this information was obtained from the housewife and she did not always know her husband's status concerning a history of tonsillectomy, she was requested to obtain the needed information from him or if possible from his parents.

The data in this analysis are limited to the records of the members of the families under observation in the two communities during the school year September, 1948–May, 1949. Infants under 1 year of age were not considered at risk of tonsillectomy; consequently the population includes only those persons 1 year of age or older during their observation.

Nineteen hundred and ninety-one, or 46 per cent of the total 4,374 persons observed had had tonsils removed. Information concerning age at the time of removal was vague for 135; 114 were reported to have had tonsils removed "as a child," and 21 "during their teens." The term "as a child" has been considered as applying to ages 5–9 and the 114 persons in this group were distributed evenly over that five-year age period. The same method of procedure was followed for those who reported having tonsils removed "during their teens."

The fact of whether there had been a tonsillectomy was unknown for only 73, or 1.6 per cent of the total persons observed in the school year September, 1948–May, 1949.³

RISK OF TONSILLECTOMY

In order to study the change in the risk of tonsillectomy over a period of sixty-nine years, 1880–1949, the population was divided into three groups. Group 1 includes persons born before 1910; these persons were 40 years of age or older in 1949. Group 2 includes persons born during the period 1910–1929;

² Less than 1 per cent of the families in either community refused to cooperate in the special study.

³ If all three school years are combined the proportion of persons unknown as to tonsillectomy status is somewhat higher, 3 per cent compared with 1.6 per cent in 1948–1949.

Sex	NUMBER OF PERSONS			
	Persons Born Before 1910	Persons Born 1910-1929	Persons Born 1930-1948	Total All Years
Male	664	462	1,022	2,148
Female	542	650	1,034	2,226

Table 1. Number of male and female persons born in three twenty-year periods and for whom a history of tonsillectomy was obtained.

they were 20-39 years of age in 1949. Group 3 was composed of those born in the period 1930-1948; their ages ranged from 1-19 years in 1949.

Table 1 shows the number of male and female persons born in each period. Forty-seven per cent of the total persons were born in the most recent time period, 25 per cent were born in the twenty-year period, 1910-1929, and 28 per cent were born before 1910.

An adaptation of life-table methods has been used to study the risk of tonsillectomy at specific ages in each of the three periods of years. The probability of tonsillectomy at a given age is obtained by the use of the following formula: $q_x = \frac{t_x}{l_x}$; l_x is the number of persons at risk of tonsillectomy and t_x is the number of persons who had a tonsillectomy at that age.

The 4,374 person included in the study were classified according to the occupation of the head of the household of which they were members. The data are shown according to three classes: (1) professional and managerial class, (2) clerical and skilled workers, and (3) semi-skilled or unskilled workers.

Figure 1 shows the probability of tonsillectomy for males and females born in each of the three time periods. These data include only persons in families where the head of the household was in the professional or managerial occupational class. These curves represent cumulative per cents. They show the proportion at each age who have had their tonsils removed. In each of the three time periods the curve for persons in both sex groups rose continuously as age increased. Among those in the

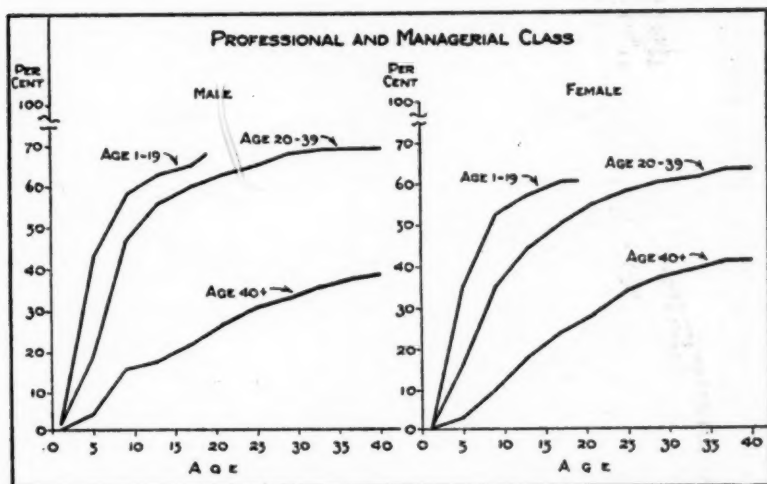


Fig. 1. Per cent of persons at specific ages who had had tonsils removed. The population includes members of families where the head of the household was in the professional or managerial occupational class. The data are shown by sex for three different periods of time: (1) persons born before 1910, aged 40 and over at the time of observation; (2) persons born from 1910-1929, aged 20-39 at the time of observation; and (3) those born during the period 1930-1948, aged 1-19 at the time of their observation in 1949. Pleasantville and Mt. Kisco, New York.

older age groups, persons aged 20-39 and those 40 years and over, when last observed, there is some tendency for the curves to maintain a level after age 35. This was true of both sexes.

The most striking point brought out by Figure 1 is the difference in the risk of tonsillectomy in the three successive periods of time. For example, among males 40 years of age or older in 1949, only 4 per cent had their tonsils removed by the time they were age 5 compared with 18 per cent of those in the subsequent period, persons aged 20-39 in 1949. In the most recent period of time, 42 per cent had their tonsils removed by the time they were 5 years of age.

By the time of age 19, males born in each of the two periods after 1909 showed fairly similar proportions with a history of having had a tonsillectomy. The per cents are 67 and 61 for the most recent and the later time period, respectively. These percentages are more than twice as high as that noted for males who were 40 years of age or older in 1949. At age 19, only 24

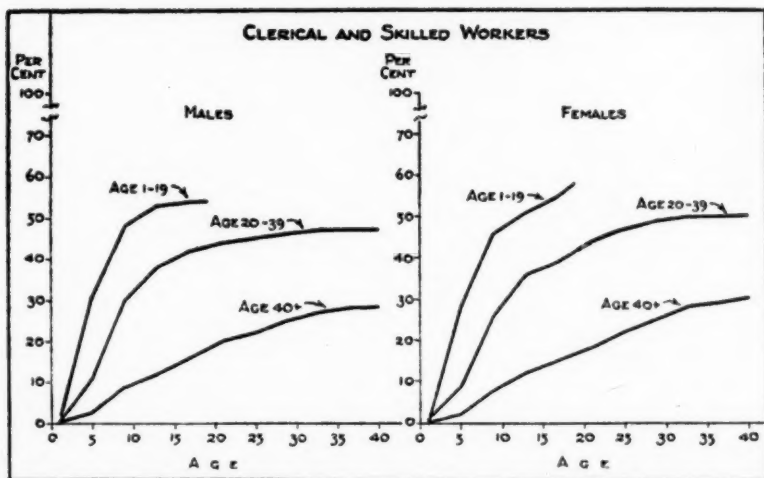


Fig. 2. Per cent of persons at specific ages who had had tonsils removed. The population includes members of families where the head of the household was in the clerical or skilled-worker class. The data are shown by sex for three different periods of time: (1) persons born before 1910, aged 40 and over at the time of their observation; (2) persons born from 1910-1929, aged 20-39 at the time of observation; and (3) those born during the period 1930-1948, aged 1-19 at the time of their observation in 1949. Pleasantville and Mt. Kisco, New York.

per cent had had their tonsils removed. The data for females show the same general indications as those noted for males.

Figures 2 and 3 show the same type of data for persons in families where the head of the household was in the clerical or skilled-worker class and for those in the semi-skilled and unskilled-worker class as was presented in Figure 1. The data presented in each chart indicate the same general differences in the risk of tonsillectomy in the different time periods as were noted for the population portrayed in Figure 1.⁴

These data indicate very clearly a considerable increase in popularity of tonsillectomy after 1910. It may be assumed that many tonsillectomies were done as a prophylactic measure. There is no evidence that during the most recent period of time, 1930-1949, there has been any abatement in the frequency of tonsillectomy compared with the previous twenty years. Nor do the data suggest the use of greater discrimination in the

⁴ Appendix Table 1 shows the population upon which Figures 1, 2, and 3 are based.

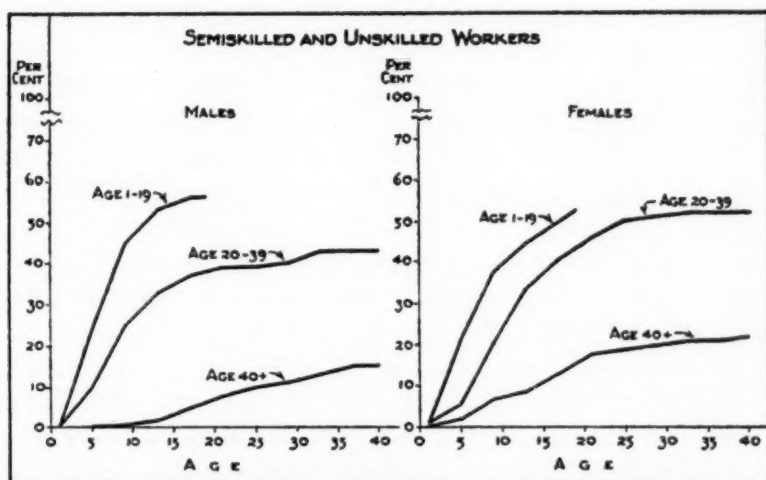


Fig. 3. Per cent of persons at specific ages who had had tonsils removed. The population includes members of families where the head of the household was in the semiskilled or unskilled-worker class. The data are shown by sex for three different periods of time: (1) persons born before 1910, aged 40 and over at the time of their observation; (2) persons born from 1910-1929, aged 20-39 at the time of observation; and (3) those born during the period 1930-1948, aged 1-19, at the time of their observation in 1949. Pleasantville and Mt. Kisco, New York.

selection of persons subjected to this operative procedure than was true in the period of 1910-1929.

Figure 4 shows the per cent of males and females at each age in each time period who had had a tonsillectomy. All occupational classes in the two communities have been combined; consequently the data for all families may be considered to be fairly representative of communities similar to the two studied in Westchester County, New York.⁵

In the most recent period of time, 55 per cent of the males and 58 per cent of the females had had their tonsils removed by the time they reached age 19. Among persons born during the period 1910-1929, 48 per cent of the males and 47 per cent of the females had had their tonsils removed by the time they were 19 years of age. These per cents are strikingly different when compared with those among persons born before 1910. Only 18 per cent of the males and 20 per cent of the females

⁵ Appendix Tables 3, 4, 5, 6, 7, and 8 show the data upon which Figure 4 is based.

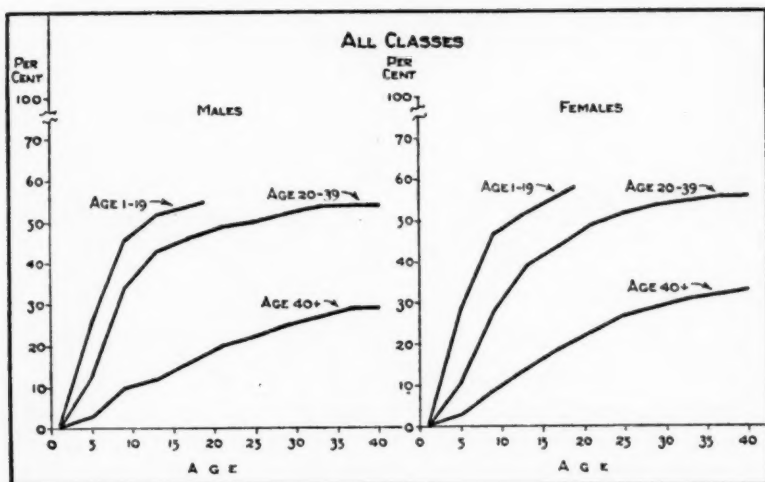


Fig. 4. Per cent of persons at specific ages who had had tonsils removed. The percentages are based upon members of all families observed in 1949. The data are shown by sex for three different periods of time: (1) persons born before 1910, aged 40 and over at the time of their observation; (2) persons born from 1910-1929, aged 20-39 at the time of observation; and (3) those born during the period 1930-1948, aged 1-19 at the time of their observation in 1949. Pleasantville and Mt. Kisco, New York.

in this group had had a tonsillectomy by the time they attained age 19. Furthermore, only 29 per cent of the males and 33 per cent of the females in this age group had had their tonsils removed by age 39 compared with 54 and 56 per cent among those who were born in the later period, 1910-1929.

It is apparent that during the past thirty-nine years there has been no change in the frequency of tonsillectomy in the population studied. Also, it is an operative procedure applied to children and adults in every social class. According to Gale, "There are few subjects on which opinions are more divided than on that of tonsillectomy. The differences of opinion are reflected in the bewildering array of indications and contra-indications for operation given in textbooks of otolaryngology and of pediatrics." Gale then raises the question as to whether tonsillectomy does any good (3).

Gafaer in a study of adults found no significant difference with respect to frequency or severity of the common cold be-

tween those persons who had had a tonsillectomy and those who had not had a tonsillectomy (4). Kaiser followed 4,400 children for a period of ten years; half the number had had tonsils removed, the other 2,200 children had no tonsillectomy. Some advantages, such as fewer attacks of otitis media, were noted in the group where tonsils were removed (5).

In the study in Pleasantville and Mt. Kisco the incidence of all respiratory illness was generally similar among persons with tonsils present to persons with tonsils removed. On the other hand, children in the 5-18 year age group with tonsils present suffered an attack rate from tonsillitis and septic sore throat from 66 to 79 per cent higher than did children with tonsils removed. However, it should be emphasized that tonsillitis and septic sore throat comprise only 3 per cent of the total acute respiratory illness reported for the population studied in Westchester County (6). Such illnesses affect a small proportion of the total population.

There is need for more study of the effect of tonsillectomy upon the individual's health. Gale made the following comment about a study made in England: "In the report on epidemics in schools, which was concerned for the most part with children over 13 years of age, it was found that there was virtually no difference in the attack rates of nasopharyngeal infections, scarlet fever, rheumatism, appendicitis, otitis media (with or without mastoiditis), or pneumonia in the operated and unoperated groups. . . . This section of the report ends with the words: 'One cannot avoid the conclusion that there is a tendency for the operation to be performed as a routine prophylactic ritual for no particular reason and with no particular result'" (3).

ACKNOWLEDGMENTS

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Appendix Table 1. Number of persons at specific ages when last observed, classified according to the occupation of the head of the household.

AGE GROUP	NUMBER OF PERSONS	
	Male	Female
	PROFESSIONAL AND MANAGERIAL CLASS	
1-19 Years	436	461
20-39 Years	175	263
40 and Over	299	246
	CLERICAL AND SKILLED WORKERS	
1-19 Years	313	308
20-39 Years	142	199
40 and Over	187	153
	SEMISKILLED AND UNSKILLED WORKERS	
1-19 Years	273	265
20-39 Years	145	188
40 and Over	178	143

APPENDIX 2

*Statistical Method Used to Obtain
Probability of Tonsillectomy*

Appendix Tables 3, 4, 5, 6, 7 and 8 give the detailed data from which the cumulative percentages shown in Figure 4 were derived.

The formula used for calculation of the probability of tonsillectomy is as follows: $q_x = \frac{t_x}{l_x}$ t_x = the number of tonsillectomies at each age.
 l_x = the number exposed to risk of tonsillectomy at each age.

For persons who were 1-19 and those aged 20-39 when last observed, l_x = the mean number exposed to risk at each age. In each of these age groups the persons included had not all reached the age limit of the group when last observed. The mean number exposed to the risk of tonsillectomy at a specific age was obtained by the inclusion of persons who passed that age plus one-half of those who had attained that age but did not reach a higher age when last observed. Inclusion of only one-half of the persons who did not reach a higher age was necessary since their complete experience concerning tonsillectomy at their last age was not known.

It was not necessary to calculate the mean number observed at each age for persons aged 40 and over. All had reached age 40 when last observed. There were only 4 males and 5 females who had had tonsils removed after age 40. Therefore, it was not considered important to show the data beyond the age of 40.

Appendix Table 3. Probability of tonsillectomy at specific ages among males 1-19 years of age in two communities, Pleasantville and Mt. Kisco, New York.

AGE IN YEARS	MEAN NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
1	998.5	9	0.9	99.1	99.1	0.9
2	946.5	36	3.8	96.2	95.3	4.7
3	876.0	73	8.3	91.7	87.4	12.6
4	794.0	76	9.6	90.4	79.0	21.0
5	725.0	120	16.6	83.4	73.8	26.2
6	613.5	70	11.4	88.6	65.4	34.6
7	596.0	48	8.1	91.9	60.1	39.9
8	547.5	28	5.1	94.9	57.0	43.0
9	510.0	22	4.3	95.7	54.5	45.5
10	448.5	21	4.7	95.3	51.9	48.1
11	391.0	10	2.6	97.4	50.6	49.4
12	353.5	7	2.0	98.0	49.6	50.4
13	305.5	9	2.9	97.1	48.2	51.8
14	255.5	2	0.8	99.2	47.8	52.2
15	218.5	3	1.4	98.6	47.1	52.9
16	166.0	3	1.8	98.2	46.3	53.7
17	91.0	0	0.0	100.0	46.3	53.7
18	41.0	1	2.4	97.6	45.2	54.8
19	6.5	0	0.0	100.0	45.2	54.8

Appendix Table 4. Probability of tonsillectomy at specific ages among females 1-19 years of age in two communities, Pleasantville and Mt. Kisco, New York.

AGE IN YEARS	MEAN NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
1	1,006.5	3	0.3	99.7	99.7	0.3
2	958.5	25	2.6	97.4	97.1	2.9
3	893.5	68	7.6	92.4	89.7	10.3
4	814.5	83	10.2	89.8	80.6	19.4
5	742.5	91	12.3	87.7	70.7	29.3
6	640.5	66	10.3	89.7	63.4	36.6
7	594.0	38	6.4	93.6	59.3	40.7
8	557.5	30	5.4	94.6	56.1	43.9
9	505.5	24	4.7	95.3	53.5	46.5
10	439.0	22	5.0	95.0	50.8	49.2
11	392.0	10	2.6	97.4	49.5	50.5
12	353.0	5	1.4	98.6	48.8	51.2
13	302.5	4	1.3	98.7	48.2	51.8
14	246.5	2	0.8	99.2	47.8	52.2
15	188.0	5	2.7	97.3	46.5	53.5
16	130.5	4	3.1	96.9	45.1	54.9
17	83.5	2	2.4	97.6	43.7	56.3
18	53.0	2	3.8	96.2	42.0	58.0
19	9.5	0	0.0	100.0	42.0	58.0

Appendix Table 5. Probability of tonsillectomy at specific ages among males aged 20-39 in two communities, Pleasantville and Mt. Kisco, New York.

AGE IN YEARS	MEAN NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
1	462	2	0.4	99.6	99.6	0.4
2	460	1	0.2	99.8	99.4	0.6
3	459	6	1.3	98.7	98.1	1.9
4	453	18	4.0	96.0	94.2	5.8
5	435	34	7.8	92.2	86.9	13.1
6	401	29	7.2	92.8	80.6	19.4
7	371	23	6.2	93.8	75.6	24.4
8	348	27	7.8	92.2	69.7	30.3
9	321	19	5.9	94.1	65.6	34.4
10	302	20	6.6	93.4	61.3	38.7
11	282	5	1.8	98.2	60.2	39.8
12	277	13	4.7	95.3	57.4	42.6
13	264	0	0.0	100.0	57.4	42.6
14	264	1	0.4	99.6	57.2	42.8
15	263	8	3.0	97.0	55.5	44.5
16	255	8	3.1	96.9	53.8	46.2
17	247	1	0.4	99.6	53.6	46.4
18	246	4	1.6	98.4	52.7	47.3
19	242	3	1.2	98.8	52.1	47.9

Appendix Table 5—Continued

AGE IN YEARS	MEAN NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
20	235.0	2	0.9	99.1	51.6	48.4
21	222.5	1	0.4	99.6	51.4	48.6
22	211.5	1	0.5	99.5	51.1	48.9
23	203.0	3	1.5	98.5	50.3	49.7
24	193.5	1	0.5	99.5	50.0	50.0
25	185.5	1	0.5	99.5	49.8	50.2
26	179.5	0	0.0	100.0	49.8	50.2
27	175.5	3	1.7	98.3	49.0	51.0
28	164.5	2	1.2	98.8	48.4	51.6
29	153.5	2	1.3	98.7	47.8	52.2
30	145.5	3	2.1	97.9	46.8	53.2
31	135.0	0	0.0	100.0	46.8	53.2
32	123.5	0	0.0	100.0	46.8	53.2
33	106.0	1	0.9	99.1	46.4	53.6
34	88.5	0	0.0	100.0	46.4	53.6
35	74.5	0	0.0	100.0	46.4	53.6
36	60.5	0	0.0	100.0	46.4	53.6
37	48.0	0	0.0	100.0	46.4	53.6
38	29.0	0	0.0	100.0	46.4	53.6
39	8.5	0	0.0	100.0	46.4	53.6

Appendix Table 6. Probability of tonsillectomy at specific ages among females aged 20-39 in two communities, Pleasantville and Mt. Kisco, New York.

AGE IN YEARS	MEAN NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
1	650	2	0.3	99.7	99.7	0.3
2	648	4	0.6	99.4	99.1	0.9
3	644	18	2.8	97.2	96.3	3.7
4	626	15	2.4	97.6	94.0	6.0
5	611	32	5.2	94.8	89.1	10.9
6	579	36	6.2	93.8	83.6	16.4
7	543	38	7.0	93.0	77.7	22.3
8	505	21	4.2	95.8	74.4	25.6
9	484	18	3.7	96.3	71.6	28.4
10	466	25	5.4	94.6	67.7	32.3
11	441	16	3.6	96.4	65.3	34.7
12	425	15	3.5	96.5	63.0	37.0
13	410	10	2.4	97.6	61.5	38.5
14	400	8	2.0	98.0	60.3	39.7
15	392	12	3.1	96.9	58.4	41.6
16	380	8	2.1	97.9	57.2	42.8
17	372	9	2.4	97.6	55.8	44.2
18	363	13	3.6	96.4	53.8	46.2
19	353	5	1.4	98.6	53.0	47.0

Appendix Table 6—Continued

AGE IN YEARS	MEAN NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
20	337.5	7	2.1	97.9	51.9	48.1
21	316.5	5	1.6	98.4	51.1	48.9
22	301.0	8	2.7	97.3	49.7	50.3
23	285.0	5	1.8	98.2	48.8	51.2
24	273.0	4	1.5	98.5	48.1	51.9
25	264.5	1	0.4	99.6	47.9	52.1
26	257.5	1	0.4	99.6	47.7	52.3
27	250.5	2	0.8	99.2	47.3	52.7
28	239.0	7	2.9	97.1	45.9	54.1
29	220.5	1	0.5	99.5	45.7	54.3
30	209.5	0	0.0	100.0	45.7	54.3
31	196.5	2	1.0	99.0	45.2	54.8
32	178.5	0	0.0	100.0	45.2	54.8
33	157.0	1	0.6	99.4	44.9	55.1
34	136.0	0	0.0	100.0	44.9	55.1
35	119.0	0	0.0	100.0	44.9	55.1
36	95.0	2	2.1	97.9	44.0	56.0
37	69.5	0	0.0	100.0	44.0	56.0
38	46.0	0	0.0	100.0	44.0	56.0
39	15.5	0	0.0	100.0	44.0	56.0

Appendix Table 7. Probability of tonsillectomy at specific ages among males aged 40 and over in two communities, Pleasantville and Mt. Kisco, New York.

AGE IN YEARS	NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
1	664	0	0.0	100.0	100.0	0.0
2	664	0	0.0	100.0	100.0	0.0
3	664	3	0.5	99.5	99.5	0.5
4	661	0	0.0	100.0	99.5	0.5
5	661	15	2.3	97.7	97.2	2.8
6	646	12	1.9	98.1	95.4	4.6
7	634	11	1.7	98.3	93.8	6.2
8	623	14	2.2	97.8	91.7	8.3
9	609	10	1.6	98.4	90.2	9.8
10	599	8	1.3	98.7	89.0	11.0
11	591	1	0.2	99.8	88.8	11.2
12	590	5	0.8	99.2	88.1	11.9
13	585	1	0.2	99.8	87.9	12.1
14	584	5	0.9	99.1	87.1	12.9
15	579	6	1.0	99.0	86.2	13.8
16	573	11	1.9	98.1	84.6	15.4
17	562	3	0.5	99.5	84.2	15.8
18	559	10	1.8	98.2	82.7	17.3
19	549	5	0.9	99.1	82.0	18.0

Appendix Table 7—Continued

AGE IN YEARS	NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
20	544	6	1.1	98.9	81.1	18.9
21	538	6	1.1	98.9	80.2	19.8
22	532	4	0.8	99.2	79.6	20.4
23	528	3	0.6	99.4	79.1	20.9
24	525	3	0.6	99.4	78.6	21.4
25	522	7	1.3	98.7	77.6	22.4
26	515	5	1.0	99.0	76.8	23.2
27	510	4	0.8	99.2	76.2	23.8
28	506	3	0.6	99.4	75.7	24.3
29	503	4	0.8	99.2	75.1	24.9
30	499	5	1.0	99.0	74.3	25.7
31	494	2	0.4	99.6	74.0	26.0
32	492	7	1.4	98.6	73.0	27.0
33	485	2	0.4	99.6	72.7	27.3
34	483	5	1.0	99.0	72.0	28.0
35	478	3	0.6	99.4	71.6	28.4
36	475	2	0.4	99.6	71.3	28.7
37	473	1	0.2	99.8	71.2	28.8
38	472	2	0.4	99.6	70.9	29.1
39	470	0	0.0	100.0	70.9	29.1
40	470	2	0.4	99.6	70.6	29.4

Appendix Table 8. Probability of tonsillectomy at specific ages among females aged 40 and over in two communities, Pleasantville and Mt. Kisco, New York.

AGE IN YEARS	NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
1	542	0	0.0	100.0	100.0	0.0
2	542	0	0.0	100.0	100.0	0.0
3	542	0	0.0	100.0	100.0	0.0
4	542	6	1.1	98.9	98.9	1.1
5	536	8	1.5	98.5	97.4	2.6
6	528	8	1.5	98.5	95.9	4.1
7	520	9	1.7	98.3	94.3	5.7
8	511	12	2.3	97.7	92.1	7.9
9	499	3	0.6	99.4	91.5	8.5
10	496	13	2.6	97.4	89.1	10.9
11	483	3	0.6	99.4	88.6	11.4
12	480	10	2.1	97.9	86.7	13.3
13	470	3	0.6	99.4	86.2	13.8
14	467	11	2.4	97.6	84.1	15.9
15	456	4	0.9	99.1	83.3	16.7
16	452	4	0.9	99.1	82.6	17.4
17	448	6	1.3	98.7	81.5	18.5
18	442	6	1.4	98.6	80.4	19.6
19	436	2	0.5	99.5	80.0	20.0

Appendix Table 8—Continued

AGE IN YEARS	NUMBER AT EACH AGE AT RISK OF TONSILLECTOMY	NUMBER OF TONSILLECTOMIES PERFORMED AT EACH AGE	PERCENTAGE WITH TONSILLECTOMY PERFORMED AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY AT EACH AGE	PERCENTAGE WITH NO TONSILLECTOMY THROUGH PRECEDING AND CURRENT AGES	PERCENTAGE WITH TONSILLECTOMY AT PRECEDING AND CURRENT AGES
20	434	10	2.3	97.7	78.2	21.8
21	424	5	1.2	98.8	77.3	22.7
22	419	5	1.2	98.8	76.4	23.6
23	414	6	1.4	98.6	75.3	24.7
24	408	4	1.0	99.0	74.5	25.5
25	404	6	1.5	98.5	73.4	26.6
26	398	6	1.5	98.5	72.3	27.7
27	392	2	0.5	99.5	71.9	28.1
28	390	2	0.5	99.5	71.5	28.5
29	388	3	0.8	99.2	70.9	29.1
30	385	4	1.0	99.0	70.2	29.8
31	381	4	1.0	99.0	69.5	30.5
32	377	1	0.3	99.7	69.3	30.7
33	376	2	0.5	99.5	69.0	31.0
34	374	2	0.5	99.5	68.7	31.3
35	372	3	0.8	99.2	68.2	31.8
36	369	2	0.5	99.5	67.9	32.1
37	367	2	0.5	99.5	67.6	32.4
38	365	2	0.5	99.5	67.3	32.7
39	363	1	0.3	99.7	67.1	32.9
40	362	0	0.0	100.0	67.1	32.9

CHARACTERISTICS OF PSYCHONEUROTIC PATIENTS AND THEIR FAMILIES AS REVEALED IN A GENERAL MORBIDITY STUDY¹

JEAN DOWNES AND KATHERINE SIMON²

THE longitudinal observation of a sample of the white families living in the original Eastern Health District of Baltimore made it possible to study both prevalence and incidence of chronic conditions in these families. The purpose of this paper is to give a description of the amount of certain mental disorders that were reported by the family informants. Emphasis is placed particularly on a description of the persons who were reported as having a psychoneurosis or chronic nervousness and a study of their families.

DATA AND METHOD OF STUDY

Briefly, the method of study was as follows: Families living in thirty-four city blocks were visited at monthly intervals to obtain a record of illness among their members. In seventeen of the thirty-four city blocks the families were visited over a period of five years; in the other seventeen, visiting was continued for only three years in families where no chronic conditions were reported during that period. In these blocks, visiting was continued for the five-year period in families which reported the presence of some chronic illness among their members.

¹ The article "Characteristics of Psychoneurotic Patients and Their Families as Revealed in a General Morbidity Study," by Jean Downes and Katherine Simon, was published in *Psychosomatic Medicine*, xv: No. 5, September-October, 1953, pp. 463-476. It is republished in the Milbank Memorial Fund *Quarterly* with the kind permission of the American Psychosomatic Society, Inc. and Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York City. Received for publication April 7, 1952.

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Careful inquiry was made concerning members of the family who were in institutions for the mentally ill, for the feeble-minded, and for other chronic conditions requiring institutional care.

The instructions for the use of the family visitors contained a list of the more common chronic diseases about which special inquiry was to be made. This special information included date of onset of the first symptoms of the disease, their nature and date, the date first diagnosed, and whether the diagnosis was made by a private physician, at a clinic, or at a hospital. Illnesses that were reported as chronic were asked about on each subsequent visit to the family. Inquiry was made concerning the amount of discomfort and disability suffered from the condition since the last visit and the amount of medical care received for it.

The causes of chronic illness as reported by the family informants were submitted to the attending physicians for confirmation or correction. The cases which had clinic attendance and those which had hospital admissions were also checked against the records of the clinic or hospital where the service was given. The only exception to this procedure was for cases hospitalized outside the city of Baltimore.

The chronic conditions included in this analysis are the psychoneuroses and the complaint of chronic nervousness.

In a study of the complaint of nervousness and the psychoneuroses in the population of the original Eastern Health District of Baltimore, made by Lemkau and his associates, it was concluded that,

... The lay term nervous is used to cover a multitude of psychiatric conditions, but when treated as a residual group, after the removal of known psychotics and mental defectives, this group corresponds in sex and race distribution patterns to the group of adult cases diagnosed as psychoneurosis or as having neurotic traits (5).

This was considered as sufficient reason for including nervous cases in a group called the "adult neurotic group." Therefore,

in the present analysis, persons with the complaint of chronic nervousness have been included with those who had a physician's diagnosis of some type of psychoneurosis.

COMPARISON OF SAMPLE WITH THE TOTAL DISTRICT

It is of interest to compare the results obtained from the study of a sample of the white families in the Eastern Health District with those obtained by Lemkau and his associates in a survey of the entire white population of the district. The observation of the sample population was over the period from June, 1938, to May, 1943. The mental hygiene survey of the entire district was made in 1936. A brief description of the method of this survey may be cited:

... Suffice it to say, that information concerning mental deviants was collected from a great variety of sources—hospitals, clinics, courts, social agencies, etc.—and that it was possible to verify the residence of the great majority of the cases found by identification in the household rosters of the National Health Survey. The N.H.S. was also the source of additional cases³ (7).

Family reporting of cases was the method used in the continued survey of the sample of white families.

Table 1 shows the prevalence of psychosis and of psychoneurosis among white persons found in the two studies. These are annual rates per 1,000 population. The difference in the rates of psychosis cannot be interpreted as real because the enumeration made by the National Health Survey in 1936 did not include persons who had been institutionalized for more than twelve months. In the study of the sample of families these cases were included. It is possible to adjust the rate of psychosis in the sample of families by exclusion of those persons who had been in an institution for mental disorder for more than twelve months prior to the first visit to the family. The rate thus obtained, 3.7 per 1,000 person years, is precisely the same as that noted for the entire Eastern Health District

³ The National Health Survey was made during the winter months of 1935-1936 and included the entire original Eastern Health District.

in 1936. The rates of psychoneurosis obtained in the two studies were also strikingly similar.

Such precise agreement in prevalence rates obtained by

Table 1. Prevalence of cases of mental disorder in a sample of white families in the Eastern Health District observed during the period June, 1938-May, 1943, and in the total white population of the Eastern Health District in 1936.¹

TYPE OF DISORDER	SAMPLE OF FAMILIES FROM THE EASTERN HEALTH DISTRICT ²	TOTAL EASTERN HEALTH DISTRICT (WARDS 6 AND 7) ³
	Annual Rate per 1,000 Population	
Psychosis	5.3	3.7
Psychoneurosis ⁴	15.1	15.0

¹ The population of the sample of families included 20,832 person-years of life. The white population of the total district numbered 42,422 in 1936.

² Cases which had been institutionalized for more than twelve months were not included in the enumeration made by the National Health Survey in 1936. In the study of the sample of families such cases have been included.

³ Psychoneurosis includes adult neurotics, psychopathic personalities and adult behavior deviates, and children with behavior disorder.

different methods of collecting records of psychotics and psychoneurotic persons at different times in a population is no doubt in part accidental. However, there is internal evidence as to the similarity of the data. In both studies the rates for male and female psychotics were about equal. In the study made in the entire district, females formed 73 per cent of the total psychoneurotics in the white population. In the sample of families, females constituted 71 per cent of this group. When children with behavior problems are included with the psychoneurotics, as was done in Table 1, they formed fairly similar proportions of the total in each study.⁴

Another point of interest brought out by Table 1 is the fact that the rate of psychoneurosis was about three times as great as that for psychosis. A different method of study of a population would no doubt give entirely different results. For example, psychiatric examination of an entire population would probably indicate that the rate of psychoneurosis is much higher than the rate obtained through reports of illness by a

⁴ For a full explanation of the method of computing rates of prevalence of chronic illness in the study of the sample of families in the Eastern Health District, see Downes (3).

family informant. Rennie has said, "The psychoneuroses constitute the bulk of every general medical practice. By conservative estimate 60 per cent of all the patients who go to private physicians suffer not from organic diseases but from psychoneurotic conditions." (6)

PSYCHONEUROSIS AND NERVOUSNESS

Since the psychoneuroses and chronic nervousness ranked fourth in both prevalence and incidence among types of chronic illness in the study of illness in the Eastern Health District of Baltimore, emphasis has been placed upon these illnesses (2).

The data include ninety-two persons, aged 20 or older, who were classed as psychoneurotic or as having the complaint of chronic nervousness. It should be explained that in a morbid-

Table 2. Diagnoses by a nonspecialist private physician or at a nonpsychiatric medical clinic compared with family statement of complaint, Eastern Health District of Baltimore, June, 1938-May, 1943.

Part 1

FAMILY STATEMENT OF COMPLAINT	PHYSICIAN AND CLINIC DIAGNOSES					
	Total Cases	Psycho- neurosis	Neu- ras- thenia	Anxiety State; Anxiety Neurosis	Neurotic- functional Neurosis	Nerv- ous- ness
TOTAL	41	14	6	7	7	7
Nervous Only	8	3	1			4
Nervous With:						
Indigestion	3	1		1		1
Heart Trouble	1			1		
Low Blood Pressure	3	1			1	1
High Blood Pressure	1	1				
Menopause	1				1	
Headache	1	1				
Other Complaints ¹	5	1	2	1	1	
Nervous Breakdown	3	1		1	1	
Nervous Breakdown With:						
High Blood Pressure						
Other Complaints ²	3	1	1			1
Heart Trouble	3		1	1	1	
Shell Shock	1	1				
Other Complaints ³	8	3	1	2	2	

Part 2

FAMILY STATEMENT OF COMPLAINT	PHYSICIAN AND CLINIC DIAGNOSES						
	Total Cases	Gastric Neu- rosis; Psycho- neurotic Indiges- tion	Neuro- Circu- latory Asthe- nia; Cardiac Neu- rosis	Consti- tutional Psycho- pathic State	Nerv- ous Break- down	Neuro- derma- titis	Hys- teria
TOTAL	14	5	4	1	2	1	1
Nervous Only	1			1			
Nervous With:							
Indigestion	5	4					1
Heart Trouble	2		2				
Low Blood Pres- sure							
High Blood Pres- sure							
Menopause							
Headache							
Other Com- plaints ¹							
Nervous Break- down	1				1		
Nervous Breakdown With:							
High Blood Pressure	1				1		
Other Com- plaints ²							
Heart Trouble	2	1	1				
Shell Shock							
Other Complaints ³	2		1			1	

¹ Includes nervous with weakness, giddiness, stuttering, run-down condition, and anemia.

² Includes nervous breakdown with lump in throat and shakiness, pains in stomach, and melancholy, weakness, and heart attack.

³ Includes nervous with run-down condition, gnawing pain in side, low blood pressure, pressure on nerve in head, kidney and heart condition, worry, loss of weight, faintness, dizziness, and itching all over.

ity survey such as that conducted in the Eastern Health District of Baltimore, persons do not report themselves as suffering from a psychoneurotic illness. They report their illness in terms of complaints or symptoms. The diagnosis comes from the attending physician. Sixty-six of the ninety-two cases, or 74 per cent, had such a diagnosis. The remaining twenty-six

patients complained of chronic nervousness but were not seen by a physician for this complaint.

It is of interest to indicate the terms used by the family informant in reporting the illness of the ninety-two persons classified as psychoneurotic. The complaints of the sixty-six cases who had a physician's diagnosis were reported as "nervous" or "bad nerves" with:

Bad heart	Loss of voice
Rapid heartbeat	Nervous throat
Heart trouble	Lump in throat
Cardiac neurosis	Menopause
Low blood pressure	Headache
High blood pressure	Indigestion
Shortness of breath and choking	Melancholy
Weakness and run down	Worry
Giddiness and dizzy spells	Itching all over

The complaints of the twenty-six not seen by a physician were similar to those who received a diagnosis.

Only eleven of the sixty-six cases with a physician's diagnosis were seen by a psychiatrist or visited a psychiatric clinic. The remaining fifty-five cases were diagnosed by a nonspecialist private physician or were diagnosed at a nonpsychiatric medical clinic. Table 2, Parts 1 and 2, shows a comparison of the physician and clinic diagnosis with the family's statement of the complaint. Part 1 of Table 2 shows the data for forty-one cases, and Part 2 shows the data for fourteen cases. Fourteen of the total cases were diagnosed as "psychoneurosis" with no indication as to type. Seven were given the vague classification of "nervousness," and two the classification of "nervous breakdown." These were instances where the physician checked the family statement as to the nature of the illness and did not give a more specific diagnosis.

An interesting point brought out by Table 2 is that a total of nine persons reported themselves as having heart trouble or heart attacks. None of them was found to have heart trouble.

The same was true for the two cases who reported nervousness with high blood pressure.

Table 3 shows the psychiatric diagnosis in comparison with the family statement of illness for the eleven cases who were seen by a psychiatrist or at a psychiatric clinic. The family statements as to the nature of the illness are similar to those shown in Table 2.

The twenty-six cases who had the complaint of chronic nervousness but were not seen by a physician for this illness

Table 3. Diagnoses made in a psychiatric clinic compared with family statements of illness, Eastern Health District of Baltimore, June, 1938-May, 1943.

PSYCHIATRIC DIAGNOSES	FAMILY STATEMENT OF COMPLAINT					
	Total	Nervous Only; Nervous Spells; Nervous Attack	Nervous with Indi- gestion or Intestinal Complaints	Nervous Break- down	Nervous with Short- ness of Breath, Choking	Nervous with Other Symptoms
ALL DIAGNOSES	11	3	3	1	2	2
Anxiety Neuro- sis and Anxiety Attacks	4	1	1		1	1 ^a
Anxiety Sympt- oms Featur- ing Gastroin- testinal and Respiratory Tracts	1				1	
Alcoholism	1		1			
Gastrointestinal Neurosis	1		1			
Hysterical Aphonia	1					1 ^b
Neurasthenia	1			1		
Psychoneurotic Personality and Neuras- thenia	1	1				
Neuropathic Constitution	1	1				

^a Nervous with nervous throat and dizzy spells, pains in head.

^b Nervousness and loss of voice.

were similar to those who had a medical diagnosis. These data are presented in Table 4.

It seems reasonable to conclude that, in studies of morbidity, persons who report chronic nervousness may properly be classed as suffering from a psychiatric condition. This is the same conclusion previously drawn by Lemkau from his study of cases with the complaint of nervousness.

CHARACTERISTICS OF PERSONS CLASSED AS PSYCHONEUROTIC

Study of the morbidity experience of persons over a period of time affords the unusual opportunity of describing certain characteristics of different segments of the population in comparison with the total population from which the segments are drawn. The illness experience of persons classified as psychoneurotic is one characteristic that is of interest.

Acute Illness. Table 5 shows the actual number of minor respiratory illnesses, accidental injuries, and all other acute illnesses suffered by the adult males and females who reported chronic nervousness, compared with the expected number of such illnesses. The expected number of illnesses was obtained by applying the attack rates for the total sample population at specific ages to the person-years of observation of the psychoneurotics at the same ages. Person-years for the psychoneurotics are shown by age in Table 6.

The ratio of the actual number to the expected number of illnesses is also shown in Table 5 for each type of illness among males and females. The actual number of illnesses suffered by

Table 4. Family statements of illness for cases with no physician's diagnosis, Eastern Health District of Baltimore, June, 1938-May, 1943.

FAMILY STATEMENTS OF COMPLAINTS	TOTAL
TOTAL	26
Nervous Only, Bad Nerves, Nervous Attacks or Spells	11
<i>Nervous With:</i>	
Indigestion	3
Headache	1
Menopause	1
High Blood Pressure	1
Other Symptoms ¹	5
Nervous Breakdown	3
Alcoholism	1

¹ Includes nervous with: prolonged grief, hysterics, depression, fear, shock, weakness, pains in the back, worry, dizziness, nausea, ringing in ears.

AGE GROUP	MALES			FEMALES		
	Actual Number	Expected Number	Ratio of Actual to Expected	Actual Number	Expected Number	Ratio of Actual to Expected
RESPIRATORY ILLNESS						
TOTAL: Age 20+	37	26.54	1.39	221	134.57	1.64
20-34	20	9.73	2.06	104	50.66	2.05
35-54	13	10.37	1.25	95	64.82	1.47
55+	4	6.44	0.62	22	19.09	1.15
ACCIDENTAL INJURIES						
TOTAL: Age 20+	11	6.57	1.67	53	25.90	2.05
20-34	5	2.49	2.01	16	5.81	2.75
35-54	3	2.51	1.20	33	14.97	2.20
55+	3	1.57	1.91	4	5.12	0.78
ALL OTHER ACUTE ILLNESS						
TOTAL: Age 20+	20	15.34	1.30	198	116.61	1.70
20-34	5	5.35	0.93	65	42.82	1.52
35-54	10	5.74	1.74	109	59.64	1.83
55+	5	4.25	1.18	24	14.15	1.70

Table 5. Ratio of the actual number to the expected number of respiratory illnesses, accidents, and all other acute illnesses among ninety-two cases of psychoneurosis, classified by age and sex, Eastern Health District of Baltimore, June, 1938-May, 1943.

this population showed a considerable excess over the expected number. The excess was especially marked in accidental injuries. Another interesting point brought out by this table is

Table 6. Person-years at risk of illness for ninety-two cases of psychoneurosis, classified by age and sex.

AGE GROUP	BOTH SEXES	MALES	FEMALES
ALL AGES	284	70	214
20-34	97	23	74
35-54	138	31	107
55+	49	16	33

the fact that young adults, persons under 35, were especially affected. These data are based upon small numbers but the consistency of the results among both males and

females, and for each illness category, leads some significance to them. Furthermore, the excess of illness suffered by psychoneurotics will not be surprising to those who have dealt with such patients. For example, accident-proneness is recognized as having a psychoneurotic basis.

Chronic Illness. At the beginning of observation, fourteen of the ninety-two persons with the complaint of chronic nervousness had also another chronic condition. During observation thirteen other persons developed an additional chronic condition. These data are shown in Table 7. It is noteworthy that 4 developed hypertensive vascular disease. Their ages were as follows: females, 24, 49, and 52; male, aged 24. Chronic gallbladder disease was diagnosed in a female aged 30. A male, aged 53, developed coronary disease. The ages of those who developed arthritis were: females, 32, 36, and 47; and a male aged 60.

These data indicate that some persons who complained of chronic nervousness were affected at a relatively young age by conditions commonly associated with middle and old age. Seven of the thirteen who had a new diagnosis during observa-

Table 7. Chronic conditions among ninety-two persons classed as psychoneurotic or as having chronic nervousness.

CLASSIFICATION	NUMBER OF PERSONS	NUMBER OF CASES THAT HAD ONSET PRIOR TO OBSERVATION	NUMBER OF CASES THAT HAD ONSET OR FIRST DIAGNOSES DURING OBSERVATION
TOTAL WITH OTHER CHRONIC CONDITION	27	14	13
Arthritis	11	7	4
Cardiovascular Disease	3	2	1
Hypertensive Vascular Disease	4	0	4
Diabetes	3	3	0
Gallbladder Disease	3	2	1
Tuberculosis	1	0	1
Peptic Ulcer	1	0	1
Pyelonephritis	1	0	1

tion were under 40 years of age. These persons, then, appear to constitute a group especially susceptible to certain conditions. Hypertensive vascular disease may be used as an illustration. The annual incidence of new or first diagnoses of hypertensive vascular disease among the adult males and females in the total population was 2.94 and 5.47 per 1,000, respectively. If these rates be applied to the person-years of the psychoneurotics, only 1.38 cases would be expected in this population instead of a total of four which did occur.

The illness experience of the ninety-two adult psychoneurotic persons in the sample population drawn from the Eastern Health District of Baltimore indicates that they form a special group. Their risk of suffering accidents and attacks of acute illness was considerably greater than for the general population in most age groups. Their risk of developing other chronic illnesses was also great. In addition, it is important to note that these persons were for the most part in the age groups considered most productive, that is, not in the old age group. For that reason this would appear to be a group of persons where the application of psychiatric treatment could act as a measure of prevention of both acute and chronic illness.

In conclusion, this point should be stressed: there has been no effort in this study to include all persons suffering from illnesses, some of which are presumed to have a psychosomatic basis, such as cases of peptic ulcer, rheumatoid arthritis, colitis, thyrotoxicosis, diabetes mellitus, bronchial asthma, and migraine. The nature of the data obtained in the general morbidity study does not permit classification of all of these illnesses with regard to whether they were preceded or were accompanied by psychoneurotic reactions.

FAMILY PATTERN OF CHRONIC ILLNESS

The study of chronic illness in the Eastern Health District of Baltimore has also made it possible to investigate family patterns of illness (1, 4). An index case was designated for each family with a member who had a "major chronic" illness—that is, the index case was the person with a chronic condi-

tion which determined the classification of the family.⁵ In families where, at the time of first observation, there was more than one living case, the one with the earliest onset was selected as the index person. It was then possible to learn whether other members of the family tended to have the same type of chronic illness as did the index case.

During the period of study of the families in the thirty-four city blocks in the Eastern Health District, a total of 828 families reported one or more cases of chronic illness. The shortest possible period of observation of these families was two months and the longest possible period was five years. Excluding the index case, these families contained 2,842 other family members.

The ninety-two adult psychoneurotics have been shown to form a special and unique group with respect to the amount of acute and chronic illness among them. It seems logical then to investigate as far as possible certain characteristics of the family environment of these persons. Therefore, this part of the analysis deals with the families of the adult psychoneurotics in comparison with the total universe of 828 families with chronic disease from which they were drawn.

SOCIAL CHARACTERISTICS OF THE CHRONIC DISEASE FAMILIES

Before examination of the social characteristics of the families, it is of interest to consider the position of the index case. In only 11 per cent of the 828 families was the index case a person under 20 years of age. When these families are excluded, in 81 per cent of the remaining families the index case was either the head of the household or the wife. In the ninety families where an adult psychoneurotic was the index case, the head of the household or the wife constituted 80 per cent of the total index cases.

⁵ The category "major chronic" illness includes the following conditions: heart disease, hypertension or high blood pressure, arthritis, tuberculosis, diabetes, chronic nephritis, rheumatic fever, varicose veins, chronic gallbladder disease, syphilis, malignant neoplasm, peptic ulcer, toxic goiter, epilepsy, mental deficiency, psychosis, psychoneurosis and chronic nervousness, and other important but relatively rare conditions, such as Parkinson's disease, cerebral palsy, multiple sclerosis, aplastic anemia, and pernicious anemia.

AGE GROUP	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)
	Percentage		Number	
ALL AGES	100.0	100.0	315	2,842
0-9	22.54	19.67	71	559
10-19	22.86	21.64	72	615
20-34	23.49	25.83	74	734
35-49	11.11	17.10	35	486
50-64	11.75	10.80	37	307
65+	8.25	4.96	26	141

Table 8. Age distribution of members of 828 families (index case major chronic disease), and ninety families (index case psychoneurosis) (all index cases excluded), Eastern Health District of Baltimore, June, 1938—May, 1943.

In most of the subsequent data which are presented, all index cases are excluded. The comparisons are made between the ninety families (index case, "adult psychoneurotic,") and the 828 chronic disease families, the universe from which they were drawn.

Individual Characteristics. The age constitution of the family members in the two groups is shown in Table 8. The differences between the two groups are not great. Size of family was also fairly similar in the two groups. Including the index case, the mean size of family was 4.5 persons in those where the index case was an adult psychoneurotic, compared with 4.4 persons per family in the total 828 families.

Table 9 shows the marital status of the members of the families in both groups after exclusion of the index case. Here both groups of families show a striking similarity. Fifty-five per cent of the family members were single, 36 to 37 per cent were married, and about 8 per cent were "divorced," "separated," or "widowed."

The two groups of families also showed a striking similarity with respect to completed education of family members 20 years of age or older. These data are shown in Table 10. From

15 to 16 per cent in each group had less than five years of schooling. The majority, 61 per cent (index case, psychoneurosis), and 58 per cent (total 828 families), had no more than an 8th-grade education. Eleven per cent in each group had a complete high school education, and a very small proportion, about 1 per cent, had some college education.

To summarize the salient points concerning the persons in the ninety families and in the 828 families from which they were drawn, from 41 to 45 per cent were under 20 years of age; marital status of these members in both groups was similar; educational attainment for members of both groups was also similar—from 75 to 76 per cent did not enter high school.

Family Characteristics. Certain family characteristics are of interest because they reveal some of the environmental conditions. Those for which data are available are: home ownership, moving status, crowding, and income.

Table 11 indicates that there was no marked difference between the two groups of families with respect to home ownership. Fifty-two per cent of the ninety families (index case

Table 9. Marital status of members of 828 families (index case major chronic disease), and members of ninety families (index case psychoneurosis), Eastern Health District of Baltimore, June, 1938–May, 1943.¹

MARITAL STATUS OF FAMILY MEMBERS	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)
	Percentage		Number	
TOTAL	100.0	100.0	316 ^a	2,857 ^b
Single	55.3	55.5	172	1,563
Married	36.0	37.1	112	1,046
Divorced	1.0	1.5	3	43
Separated	2.2	1.8	7	51
Widowed	5.5	4.1	17	115
Unknown Marital Status			5	39

¹ Excluding all index cases.

^a Includes 1 person, age unknown.

^b Includes 15 persons, age unknown.

EDUCATION COMPLETED	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)
	Percentage		Number	
TOTAL	100.0	100.0	262	2,406
0-4 Years Only	15.3	16.2	35	346
5-8 Years Only	60.7	58.3	139	1,243
9-11 Years Only	11.8	12.5	27	267
12 Years or More (Includes Vocational School But Not College)	11.8	11.4	27	244
College, Some, 4 Years or More	0.4	1.6	1	34
Unknown Amount of Educa- tion	12.6	11.3	33	272

Table 10. Education completed by members, age 20+, of 828 families (index case major chronic disease), and by members of ninety families (index case psychoneurosis), Eastern Health District of Baltimore, June, 1938-May, 1943.¹

¹ Index cases excluded.

psychoneurosis or chronic nervousness) owned their homes, compared with 54 per cent of the total 828 families.

The moving status of the two groups of families was also

Table 11. Home-ownership status of 828 families (index case major chronic disease), and of ninety families (index case psychoneurosis), Eastern Health District of Baltimore, June, 1938-May, 1943.

OWNER OR RENTER	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)
	Percentage		Number	
TOTAL	100.0	100.0	90	828
Owner	52.2	54.4	47	450
Renter	47.8	45.6	43	377
Unknown				1

MOVING STATUS OF FAMILY	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)
	Percentage		Number	
TOTAL	100.0	100.0	90	828
Family Did Not Move	53.7	53.2	44	403
Family Moved	46.3	46.8	38	354
Family Refused to Cooperate	8.9	8.6	8	71

Table 12. Moving status of 828 families (index case major chronic disease), and ninety families (index case psychoneurosis), Eastern Health District of Baltimore, June, 1938-May, 1943.

similar—that is, family stability as reflected in moving was equal in both groups. These data are presented in Table 12.

Each family was given a "crowding" rating. Each was graded as to the number of rooms in relation to the number, age, and sex constitution of the family members. There were four categories: (1) more than adequate, (2) adequate, (3) unsatisfactory, and (4) very unsatisfactory. The description of these categories follows:

1. *More than Adequate:* More than one room for sleeping per person or per married couple plus two additional rooms (for living room and kitchen).

2. *Adequate:* One room for sleeping for each two persons of suitable age and sex plus two additional rooms (for living room and kitchen).

3. *Unsatisfactory:* One room for sleeping for each two persons of suitable age and sex plus one additional room for kitchen.

4. *Very Unsatisfactory:* Less than one room for sleeping for each two persons of suitable age and sex plus additional room for kitchen.

Instructions given for determining suitable age for sharing a sleeping room were as follows:

1. One sleeping room for two persons of opposite sex is con-

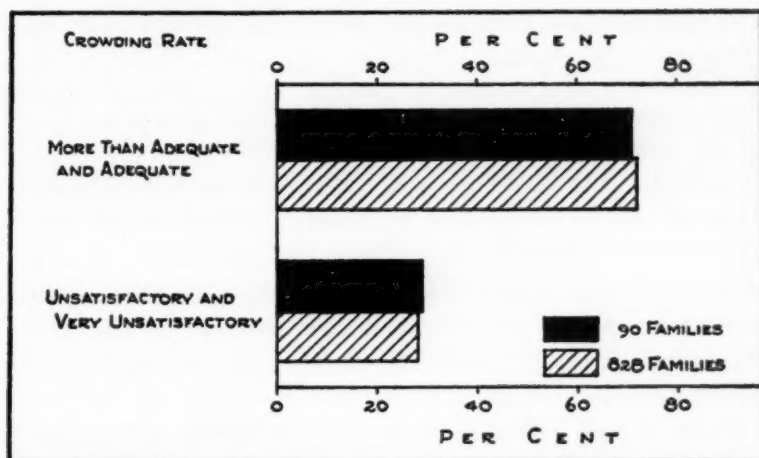


Fig. 1. Crowding rating of 828 families (index case major chronic disease) and ninety families (index case psychoneurosis), Eastern Health District of Baltimore, June, 1938-May, 1943.

sidered suitable if the two persons are married or if both are under 6 years of age.

2. Age: (a) A separate sleeping room is to be allowed for infants under 2 years of age, except where there is more than one infant under 2.

(b) Two persons under 20 years of age who are of the same

Table 13. Crowding rating of 828 families (index case major chronic disease), and ninety families (index case psychoneurosis), Eastern Health District of Baltimore, June, 1938-May, 1943.

CROWDING RATING	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC DISEASE (828 FAMILIES)
	Percentage		Number	
TOTAL	100.0	100.0	90	828
More Than Adequate	38.9	44.5	35	368
Adequate	32.2	27.6	29	228
Unsatisfactory	22.2	18.2	20	150
Very Unsatisfactory	6.7	9.7	6	80
Unknown			0	2

sex may share the same room if there is less than six years difference in their ages.

(c) Two adults who are 20 years of age or older and of the same sex may share the same sleeping room if there is less than fifteen years difference in their ages.

(d) An adult 20-25 years of age may share a room with a younger person of the same sex if there is less than six years difference in their ages.

The crowding rating, which takes into account the age and sex constitution of the family, is an attempt to arrive at a more sensitive index than is afforded by grades based on number of persons per room.

Figure 1 and Table 13 show the proportion of families in each group rated according to crowding. The groups showed no important differences. From 28 to 29 per cent were rated as unsatisfactory or very unsatisfactory and the remainder were rated as having adequate or more than adequate living space.

The annual income of the family includes money received from all sources by any member of the family. The annual income in the ninety families (index case, psychoneurosis) was \$1,405, compared with \$1,462 for the total 828 chronic disease families.⁶ These data are shown in Table 14.

An examination of socio-economic characteristics of the

Table 14. Mean income for 828 families (index case major chronic disease), and for ninety families (index case psychoneurosis), Eastern Health District of Baltimore, June, 1938-May, 1943.

TYPE OF FAMILY	MEAN INCOME	STANDARD ERROR OF THE MEAN	STANDARD DEVIATION	NUMBER OF FAMILIES
Index Case Psychoneurosis	\$1,405.84	\$108.89	\$955	77 ^a
Index Case Major Chronic Disease	\$1,462.39	\$ 37.25	\$970	678 ^b

^a Excludes 13 unknown as to income.

^b Excludes 150 unknown as to income.

⁶ These data exclude families with unknown income. Fourteen per cent of the ninety families had unknown income and 18 per cent of the total 828 families were in this class with respect to income.

family unit has indicated no important differences between the ninety families (index case, psychoneurosis) and the total 828 families with chronic disease.

FAMILY PATTERN OF CHRONIC DISEASE

Chronic disease in families may constitute an important environmental factor. Therefore it is important to know the extent to which persons other than the index case in these families were affected by chronic illness. Table 15 compares the percentage of persons in the ninety families who had a chronic condition with that in the total 828 families. The data are shown by type of diagnosis. It is important to emphasize that all index cases have been excluded and that no person in these families is counted in more than one diagnosis class.

It is apparent that persons with chronic illness were more highly concentrated in the ninety families than was true of the total 828 families. Column 3 of Table 15 indicates the ratio of the percentage of persons affected in the total families. These ratios indicate that the ninety families were outstanding because of the presence of psychosis and mental deficiency

Table 15. Percentage of persons with a major chronic condition in two groups of families (index cases excluded), Eastern Health District of Baltimore, June, 1938-May, 1943.¹

DIAGNOSIS CLASS	INDEX CASE PSYCHO- NEUROSIS (90 FAMILIES)	INDEX CASE MAJOR CHRONIC CONDITION (828 FAMILIES)	COLUMN 1
			COLUMN 2
TOTAL	26.98	14.80	1.82
Psychosis and Mental Deficiency	3.81	0.32	11.91
Mental Retardation	0.32	0.14	2.29
Psychoneurosis and "Nervous- ness"	1.90	1.48	1.28
Rheumatic Fever	2.54	1.09	2.33
Heart Disease	4.76	2.64	1.80
Hypertensive Vascular Disease and Arteriosclerosis	3.81	1.72	2.22
Diabetes	0.63	0.35	1.80
Arthritis	2.86	2.67	1.07
All Other Chronic Diseases	6.35	4.39	1.45

¹ No family member is counted in more than one disease category.

among their members. Persons who were classed as mentally retarded, those who had rheumatic fever, and those who had hypertensive vascular disease were also proportionately more frequent in the families selected on the basis of an adult member considered psychoneurotic.

The difference between the two groups of families with respect to the proportion affected by a chronic condition is highly significant. Table 16 shows the observed and expected number of persons with chronic disease in each group of families and the chi-square values obtained.⁷ The probability of such a difference being due to chance variation was entirely negative.

From the epidemiological point of view, the data presented in this paper suggest the need for further investigation along two lines if an understanding of how chronic conditions are produced is to be increased. First, more penetrating and sensitive indices of social environment must be arrived at instead of considering only such indices as family mobility, crowding, home ownership, income, and education. Second, there is need to study and consider the role that may be played by genetic and constitutional factors in influencing family patterns of disease.

Table 16. Observed and expected number of persons with a chronic condition in ninety families (index case psychoneurosis), and in the total 828 families (index case a major chronic condition).

FAMILY CLASSIFICATION	OBSERVED NUMBER	EXPECTED NUMBER	CHI-SQUARE
Index Case Psychoneurosis or Chronic Nervousness			
Persons with a Chronic Condition	85	50.49	23.5794
Persons with No Chronic Condition	230	264.51	4.5013
Index Case a Major Chronic Condition			
Persons with a Chronic Condition	421	455.57	2.6237
Persons with No Chronic Condition	2,421	2,386.43	.5009

$\chi^2 = 31.2053$
 $P < .0000001$.

⁷ The chi-square test was applied to test the hypothesis that with respect to chronic illness in other members of the family, the difference between the families of the adult psychoneurotics and the total 828 families from which they were drawn may be due solely to chance.

SUMMARY

This report presents an analysis of the characteristics of psychoneurotics and their families as revealed in the morbidity study made in the Eastern Health District of Baltimore.

The illness experience of persons classed as psychoneurotic indicated that they form a special group. The rate of acute illness suffered by such persons was excessive in all illness categories—that is, respiratory illness, accidental injuries, and all other acute illness. The excess was particularly marked in accidental injuries.

From the epidemiological point of view, persons who were classed as psychoneurotic appear to be especially susceptible to the development of certain conditions, such as hypertensive vascular disease, at relatively young ages.

The ninety families of the psychoneurotic persons were compared with the total 828 families in each of which there was one or more family members affected by some form of chronic illness.

The comparison revealed no important differences between the two groups of families with respect to social environmental factors such as moving, crowding, income, home ownership, and education of persons 20 years of age and older.

It was found, however, that persons with chronic illness were highly concentrated in the ninety families where the index case was one of psychoneurosis. In these families 27 per cent of the other family members had a chronic condition, compared with only 15 per cent in the total 828 families. This difference was found to be highly significant.

Thus, persons classed as psychoneurotic and their families were outstanding because of their illness experience.

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A NOTE ON PREDICTING MANPOWER RESOURCES FROM HEALTH AND EDUCATIONAL DATA

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BECAUSE of the marked relationship that exists between variations in quality of present manpower resources among States and data for health and education obtainable a decade ago, it may be possible to estimate the quality of manpower which will be available by States a decade from now. The purpose of this paper is to show that the relative unavailability of manpower among the forty-eight States, as reflected in Selective Service rejection rates for the period from July, 1950, to April, 1952, could have been predicted with some accuracy on the basis of the statistics of 1940.

The variable to be predicted was the pre-induction examination rejection rate by States as given by General Hershey.² Predictor variables were selected on the basis of potential relevance to the physical and mental components entering into rejection for service. These variables were, respectively, the age-adjusted mortality index for 1940 as computed by the National Office of Vital Statistics,³ and the 1939-1940 expenditures per pupil in average daily attendance in full-time public elementary and secondary schools.⁴

The relationship between rejection rate and each of the selected predictor variables is substantial. The Pearson coefficient between rejection rate and age-adjusted mortality index is 0.727; between rejection rate and per capita expenditure for education, -0.682. In other words, the higher the

¹ National Institute of Mental Health.

² Data from Table 3, "Armed Forces Preinduction Examination and Induction Inspection Rejection Rates for Selective Service Registrants, by States." Statement of Major General Lewis B. Hershey before the Interstate and Foreign Commerce Committee of the House of Representatives on H. Con. Res. 19, June 9, 1952.

³ Age-Adjusted Death Rates in the United States, 1900 to 1940. *Vital Statistics—Special Reports*, Volume 23, No. 1, March 12, 1948.

⁴ Table xiv, Column 5. Current expenditure (excluding interest) per pupil in average daily attendance in full-time public elementary and secondary schools, by State, for specified years. *STATISTICS OF STATE SCHOOL SYSTEMS, 1949-50*. Federal Security Agency, Office of Education.

mortality index and/or the less spent for education, the higher is the rejection rate ten years later.

Of considerable surprise is the relatively low correlation between mortality index and the educational data: -0.256 . Although the reasons why this coefficient is not higher are matters for speculation, the relative independence of these two predictor variables indicates that they are to be used additively in predicting rejection rate. The multiple coefficient of correlation between (1) rejection rate and (2) mortality index and educational expenditures, taken together, is 0.889 . The prediction formula for the data at hand is:

$$X_c = 5.11X_1 - 0.19X_2 - 3.61$$

where

X_c is the rejection rate in 1950-1952.

X_1 is the age-adjusted mortality index in 1940.

X_2 is the per capita expenditure for education in 1939-1940.

The accompanying table presents for comparison both the computed rejection rate for the forty-eight States and the rejection rate actually observed in the twenty-two months following the outbreak of hostilities in Korea. A similar prediction formula and table may readily be developed from the educational data and vital statistics now available for 1950 provided continuance of the basic relationships to rejection rate is assumed.

It should be noted that the relationship which has been observed is concerned with *relative* rates of rejection by States and not absolute rates of rejection. Absolute rates are dependent upon over-all standards of acceptance and the availability of manpower at a particular time. The magnitude of criterion figures employed in this study was influenced by (1) the pool of older men previously rejected for service in World War II but eligible for reinspection in the months immediately following the outbreak of hostilities in Korea, and (2) the reduction in mental standards directed by Congress in 1951. These data also represent only those men passing through Selective Ser-

vice for induction and do not include those entering the Armed Forces by recruitment and through ROTC.

Further exploration of the observed relationship may be directed toward a determination of its stability when data of a different time span are used (for example, the period following April, 1952.) It is to be noted, however, that rejection rates prior to the systematic use by the Army of the Armed Forces Qualification Test in its present form would not be comparable. This test was introduced on January 1, 1950, as a means of placing acceptance and rejection for mental reasons on a uniform basis throughout the United States and represented a major administrative modification of induction procedures.

Computed and observed rates (per cent) of rejection for military service, by states.

STATE	COM- PUTED	OB- SERVED	STATE	COM- PUTED	OB- SERVED
South Carolina	57.8	63.3	Rhode Island	30.6	31.6
Arkansas	41.5	56.8	Illinois	29.7	31.1
Louisiana	50.0	55.9	California	22.1	31.0
Mississippi	53.9	55.2	Vermont	33.4	30.8
Alabama	53.4	54.6	Connecticut	26.2	30.2
Georgia	51.2	51.4	Ohio	31.7	29.9
Tennessee	45.2	49.1	Colorado	30.5	28.8
Virginia	50.1	48.7	Washington	27.5	28.7
North Carolina	46.4	45.1	Massachusetts	27.3	28.4
Kentucky	42.7	44.3	New Jersey	26.7	28.3
Florida	44.6	41.5	Wisconsin	26.1	28.1
New Mexico	40.1	39.3	Indiana	33.2	27.7
Maine	36.4	38.0	Nevada	36.8	27.0
West Virginia	39.0	37.7	Wyoming	26.4	26.8
Arizona	41.0	35.9	Idaho	32.2	26.7
Oklahoma	33.5	35.6	New Hampshire	30.1	26.6
Delaware	34.0	35.4	Nebraska	25.7	25.2
Texas	39.6	34.9	Montana	27.8	23.3
Michigan	31.0	34.8	South Dakota	24.1	23.2
Maryland	42.8	34.1	Utah	32.1	22.6
New York ¹	22.3	33.7	Iowa	23.4	22.2
Pennsylvania	37.1	32.1	Kansas	25.2	20.7
Missouri	32.7	31.9	North Dakota	27.3	20.7
Oregon	26.4	31.9	Minnesota	21.3	20.3

¹ Rate for New York obtained by averaging rate for New York City and rate for New York State exclusive of New York City.

In the interest of accurate estimation of manpower resources it might be worthwhile to use as a criterion the sum of rejections at pre-induction examination and induction inspection, and to correct for (1) per cent of individuals administratively accepted (that is, accepted by the Armed Forces notwithstanding failure on some element of the physical and mental examination), and (2) for men entering the Armed Forces through means other than the selective service system. It might also be of interest and value to examine the white-non-white differentials in the various states as a possible factor in accounting for the residual variance.

ACKNOWLEDGMENTS

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SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY

XXII. THE INTERRELATION OF FERTILITY, FERTILITY PLANNING, AND INTERGENERATIONAL SOCIAL MOBILITY

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STUDENTS of human fertility have long suspected some relationship between social mobility and reproduction. This hypothesis has been associated with the name of Arsène Dumont for over fifty years but not until recently has it been studied inductively.² The data gathered in the Indianapolis Study make it possible to examine the relationship of intergenerational social mobility to both fertility and fertility planning.

The present hypothesis was not one of those formulated by the Indianapolis Study Committee. Consequently the data at hand for its investigation are less adequate than they might have been had the investigation of this problem been planned at the outset.

Definitions. When the terms "social mobility," "mobile couples," "mobility groups," etc. are used in this analysis they refer to *intergenerational* social mobility. Social mobility refers to a change in one's social position and thus the study deals with changes in the relative social positions of parents and their

¹ This is the twenty-second of a series of reports on a study conducted by the Committee on Social and Psychological Factors Affecting Fertility, sponsored by the Milbank Memorial Fund with grants from the Carnegie Corporation of New York. The Committee consists of Lowell J. Reed, Chairman; Daniel Katz; E. Lowell Kelly; C. V. Kiser; Frank Lorimer; Frank W. Notestein; Frederick Osborn; S. A. Switzer; Warren S. Thompson; and P. K. Whelpton.

² See Berent, Jerzy: Fertility and Social Mobility. *Population Studies*, March 1952, v, No. 3, pp. 244-260.

Bresard, Marcel: Mobilité Sociale et Dimension de la Famille. *Population*, July-September, 1950, v, No. 3, pp. 533-566.

Baltzell, E. Digby: Social Mobility and Fertility Within an Elite Group. The Milbank Memorial Fund *Quarterly*, October, 1953, xxxi, No. 4, pp. 411-420.

An analysis of the relationship between intragenerational social mobility and fertility, using Indianapolis Study data, is being carried out by Ruth Riemer of the University of California.

offspring. The offspring³ in this case are the Indianapolis couples from whom the data were obtained and whose reproductive behavior is assumed to be the dependent variable. Two types of intergenerational social mobility are considered—occupational and educational.

Occupational mobility is indicated by a difference in the occupational class of father and son and also, in some cases, father and daughter with the daughter's occupational classification being derived from her husband's.⁴ The husband's longest occupation was used in establishing a couple's present position. The original status level was determined from the father's occupation during the period when the son or daughter was "growing up" (6 to 16 years of age).⁵ The conventional occupational classifications developed by the Bureau of the Census were used.

Educational mobility is indicated from a comparison of the educational levels achieved by parents and offspring.⁶ Although chief attention is given to the husbands' educational mobility, certain tabulations consider jointly the educational mobility of husband and wife. Unlike her occupational classification, the

³ Referred to as "husband" (or "wife"), "son" (or "daughter") depending on context. Their parents are referred to as "parents" or as "father" or "mother."

⁴ This procedure is followed even if the wife herself has an occupation. The fact that a wife works is certainly relevant to her reproductive behavior but it is usually her husband's status that is of major importance in defining her social position.

⁵ For more refined measures of intergenerational occupational mobility, stricter comparability of the age of father and son would be required. Thus the occupational class of the son should be compared with occupational class of the father at the same age. As indicated above, the paternal occupational class is the one observed when the son (husband in the present Study) was 6-16 years of age. Furthermore, by virtue of the eligibility requirements in the present Study there is a marked concentration of husbands in the 35-39 category.

If there were no control over age whatsoever one might expect the "upwardly mobile" husbands to be older on the average than the "downwardly mobile" husbands since they had longer opportunity to "better" the occupational class of fathers. Likewise, one might expect the father-son differences in ages to be wider on the average among the "upwardly mobile" than among the "downwardly mobile" group. Actually, no systematic differences of this type were found in the present Study.

⁶ Educational level is determined by the highest grade completed. The educational categories are not strictly equivalent for the two generations but rough equivalents can be employed.

wife's educational classification is made on the basis of her own educational attainment, not that of her husband.

Although the present hypothesis says nothing about the direction of mobility, the data distinguish between upward and downward mobility. This is fairly straightforward in the case of educational mobility.⁷ With respect to occupational mobility it was assumed that the Census classification represents an approximate rank ordering in terms of descending degrees of prestige for both generations. Data collected by the National Opinion Research Center⁸ in general support this assumption. With some combining below the semi-skilled level, the classes are as follows: Professional and Semi-Professional; Proprietors, Managers, and Officials; Clerical; Skilled; Semi-Skilled; and Unskilled. Sons of farmers⁹ were treated as upwardly mobile if they belonged to one of the upper three occupational classes; downwardly mobile if they were unskilled workers.

Fertility Planning. The categories are those that have been used throughout the Indianapolis Study.¹⁰ In order of descending degree of success in fertility planning they are as follows: "number and spacing planned," "number planned," "quasi-planned," and "excess fertility."¹¹ Of these four only the number

⁷ There is the problem of an upward secular trend in educational level which makes it difficult to set up equivalent educational levels for the two generations. By defining educational nonmobility in terms of formally equivalent categories, e.g., Father High School 4—Son High School 4, we err on the side of conservatism, for the mobile group will contain couples who are regarded, by informal considerations, as nonmobile. If social mobility is a significant principle of classification, such a procedure decreases the chances that such an assumption will be borne out. It should be noted that an attempt to allow for the upward trend by dealing with relative positions in the educational distribution made no difference in the conclusions reached. Because of its clumsiness this procedure was abandoned for the simpler device of formal equivalents.

⁸ "Jobs and Occupations: A Popular Evaluation." *Opinion News*, ix (September 1, 1947), No. 4.

⁹ It was the intention to keep farm laborers out of this classification. Tabulations made by Dr. Gerhard Lenski of the University of Michigan suggest that this aim was not always achieved. Farm laborers are classified with unskilled workers.

¹⁰ See, for example, Kiser, C. V. and Whelpton, P. K.: *Social and Psychological Factors Affecting Fertility*. ix. *Fertility Planning and Fertility by Socio-Economic Status*. The Milbank Memorial Fund *Quarterly*, April, 1949, xxvii, No. 2, pp. 210-211 (Reprint pp. 381-382).

¹¹ The four categories may be summarized as follows:

"Number and Spacing of Pregnancies Planned. The 403 couples in this group (Continued on page 72)

and spacing planned category refers to a strictly uniform character of fertility planning throughout the entire period of married life.

Fertility. The measure of fertility employed throughout is the number of children ever born per 100 couples. This is not standardized for age because the Indianapolis Study was restricted to couples married 12-15 years and with the wife under 30 and the husband under 40 at the time of marriage. Nevertheless, it is well to establish at the outset the virtual similarity of the mobile and nonmobile groups with respect to wife's age and age at marriage.

Age of Wife. The median age of wife at interview (as of last birthday) is 32.5 for the occupationally mobile wives and 32.3 for the nonmobile wives. The mean ages are 33.4 and 33.0, respectively.

Age of Wife at Marriage. Since the couples studied were restricted to those married during 1927-1929 (interviewed in 1941), similarity in age would also mean similarity in age at marriage as between the mobile and nonmobile groups. However, small differences in age at marriage by mobility status are found within certain subgroups by fertility-planning status of the couples and by occupational class of the husband. In all but three instances the mean age at marriage of nonmobile wives exhibit the most complete planning of fertility in that they had no pregnancies that were not deliberately planned by stopping contraception in order to conceive. The group consists of two major subdivisions: (a) 121 couples practicing contraception regularly and continuously and having no pregnancy, and (b) 282 couples whose every pregnancy was deliberately planned by interrupting contraception in order to conceive.

Number Planned. This group of 205 couples consists mainly of those whose last pregnancy was deliberately planned by stopping contraception in order to conceive but who had one or more previous pregnancies under other circumstances. Because of this, the couples are regarded as having planned the number but not the spacing of their pregnancies.

Quasi-Planned. This group includes 454 couples who did not deliberately plan the last pregnancy in the manner described above but who either wanted the last pregnancy or wanted another pregnancy.

Excess Fertility. This group is composed of 382 couples classified as least successful in planning size of family because they neither wanted the last pregnancy nor another."

Kiser, Clyde V. and Whelpton, P. K.: Social and Psychological Factors Affecting Fertility. ix. Fertility Planning and Fertility Rates by Socio-Economic Status. *The Milbank Memorial Fund Quarterly*, April, 1949, xxvii, No. 2, p. 211 (Reprint p. 382).

is less than that of mobile wives.¹² These differences are so slight, however, that it is doubtful that they have any substantial effect on fertility. This conclusion seems justified especially when it is recalled that all couples have been married 12-15 years during which period the effect of small differences in age at marriage on fertility would tend to be dissipated.

The Sample. The sample and sampling procedures have been described in earlier reports.¹³ This analysis is concerned only with "relatively fecund"¹⁴ couples. As indicated in the tables, in some instances the "inflated" sample of 1,444 couples is used, in others, the noninflated sample of 860 couples. This latter group consists of all the "relatively fecund" couples for whom schedules were completed. Since this group is unduly weighted with large families the inflation was adopted as a convenient way to restore proportionality to the sample. For purposes of this study either group can be used. The magnitudes of the rates and percentages are more valid in the inflated than in the

¹² The data on the average age of marriage of the wife are given below:

FERTILITY PLANNING STATUS	OCCUPATIONALLY MOBILE		OCCUPATIONALLY NONMOBILE
	Up	Down	
Number and Spacing Planned	22.3	21.5	21.1
Number Planned	20.2	19.8	19.5
Quasi-Planned	21.3	20.2	19.4
Excess Fertility	20.6	19.6	20.8
OCCUPATIONAL CLASS			
Professional	21.6	**	20.7
Proprietary	22.2	21.6	22.0
Clerical	20.9	21.2	20.8
Skilled	20.2	20.4	20.3
Semiskilled	*	19.8	18.9

** No cases, by definition.

* Figures not shown if base is less than 20.

¹³ Whelpton, P. K. and Kiser, Clyde V.: Social and Psychological Factors Affecting Fertility. v. The Sampling Plan, Selection, and Representativeness of Couples in the Inflated Sample. The Milbank Memorial Fund *Quarterly*, January, 1945, xxiv, No. 1, pp. 49-93 (Reprint pp. 163-207).

¹⁴ For definition, see *Ibid.*, pp. 50-51 (Reprint pp. 164-165).

noninflated sample but the chief purpose of the present study is that of exhibiting *differentials* in rates and percentages by mobility status. It is also apparent that the application of tests of significance is simpler for the noninflated than for the inflated samples.

The Hypotheses. The following three hypotheses will be investigated:

Hypothesis *a*—The families of socially mobile couples are smaller than those of socially nonmobile couples of comparable status.

Hypothesis *b*—The planned families of socially mobile couples are smaller than the planned families of socially nonmobile couples of comparable status.

Hypothesis *c*—Socially mobile couples are more effective in fertility planning than socially nonmobile couples of comparable status.

It seems desirable to formulate three hypotheses even though the one labeled *b* may appear to be merely a refined test of the one labeled *a*.¹⁸ Hypothesis *a* might be true because *b* and *c* are true. However, hypothesis *a* could also be true even though *b* and *c* were not true. The latter situation could arise, for example, if intergenerational mobility reduced the number of exposures to pregnancy or perhaps increased the intensity of relatively inefficient contraceptive usage.

The chief aim of this study is to determine whether intergenerational social mobility is a significant principle of classification in the consideration of reproductive behavior. It will not be possible to specify the causal mechanisms involved even if the hypotheses are confirmed in this limited sense. The mobility experience *per se*, the operation of selective factors, differential patterns of association (as between mobile and nonmobile couples) after mobility is formally completed . . . all of these and others might be the areas for study in the future in order to understand why social mobility has certain correlates. An attempt will be made to narrow the search for a causal connection,

¹⁸ In the analysis of fertility differentials the Indianapolis Study has been chiefly concerned with the size of planned families.

to either the effects of mobility or to the operation of selective factors by controlling, as precisely as possible, certain differences in the roles of mobile and nonmobile couples. The items chosen to achieve this control include the husband's occupation, his education, net worth of the couple, a general index of socioeconomic status and the amount of intragenerational occupational mobility. All of these control items cannot be applied at the same time, but in some cases simultaneous control on four is achieved. In some comparisons, age of wife at marriage and fertility-planning status are also treated as controls in addition to three or four of the more directly role-related variables.

SOCIAL MOBILITY AND FERTILITY

Hypothesis a—Size of Family. Fulllest perspective on the relationship between social mobility and fertility is achieved if the fertility of socially mobile couples is compared with two different types of nonmobile control groups. One of these consists of nonmobile couples having the same occupational (educational) position that the socially mobile couples had prior to mobility. We call these control groups "origin" groups. A second type consists of nonmobile couples of the same occupational (educational) class as that achieved by the mobile couples. Such nonmobile groups are referred to as "destination" groups.

Tables 1 and 2 present data from which comparisons of the fertility of mobile couples and "origin" groups can be made. The rates for nonmobile "origin" couples fall on the diagonal running from the upper left to the lower right hand corner of the table (upper deck). To the right of the diagonal in any row are the rates for couples of downward mobility, and to the left are the rates for couples of upward mobility. To make comparisons with "origin" couples the tables should be read horizontally.

In Table 1, mobile couples, regardless of direction of mobility, generally have lower birth rates than their "origin" controls, i.e., the nonmobile couples of similar status at "origin." This is

not surprising with respect to upwardly mobile couples because their fertility is perhaps a function of the higher status they have achieved. The lower rates for the downwardly mobile couples are worthy of note but these may be chance results. Comparisons between educationally mobile and "origin" couples are more difficult to make because of the lack of exact correspondence in educational categories. The data in Table 2 indicate, however, that husbands who rose above their fathers' educational levels have lower birth rates than those whose educational attainment was the same as that of their fathers'. An adequate test of the relation of intergenerational lowering of educational attainment to fertility cannot be made, but the few cases available fail to confirm the tendency, noted in Table

Table 1. Births per 100 couples by occupation of father and son.

OCCUPATION OF FATHER	OCCUPATION OF SON						
	Prof.	Prop.	Clerical	Skilled	Semi- skilled	Unskilled	Farmer
	BIRTHS PER 100 COUPLES						
Professional	162	175	145	*	*	*	*
Proprietary	145	207	184	202	176	*	*
Clerical	*	*	144	*	180	*	*
Skilled	237	196	160	253	218	*	*
Semiskilled	*	*	145	221	256	*	*
Unskilled	*	*	221	212	*	310 ^a	*
Farm Owner or Manager	150	147	182	206	217	*	312 ^b
OCCUPATION OF FATHER	NUMBER OF COUPLES						
	Prof.	Prop.	Clerical	Skilled	Semi- skilled	Unskilled	Farmer
	BIRTHS PER 100 COUPLES						
Professional	26	24	20	11	13	2	1
Proprietary	42	54	84	43	38	5	1
Clerical	14	18	39	14	20	2	0
Skilled	24	28	65	77	99	14	0
Semiskilled	5	10	44	47	69	15	0
Unskilled	4	7	24	25	13	8	0
Farm Owner or Manager	28	32	62	62	106	16	1

* Average of all relatively fecund unskilled workers.

^b Children ever born per 100 wives of Farmer and Farm managers, wife age 30-34; North Central states, 1940.

* Rate not shown if based on fewer than twenty cases.

1, for couples of lower status than their parents to have lower fertility rates than couples of the same status as their parents. For example, sons with either a "Grade School 8" or "High School 1-3" education and whose fathers were High School graduates or better have *higher* fertility rates than their "origin" groups, i.e., sons who, like their fathers, were High School graduates or better. No other instance of educationally downward mobility appears in Table 2.

By reading Table 1 vertically (within columns) the fertility of occupationally mobile couples can be compared with that of their "destination" controls. The rates above the diagonal are those for couples of downward mobility; those below the diagonal are for upwardly mobile couples; the rates on the diagonal are for the nonmobile "destination" groups. These data show that except within the Clerical column,¹⁶ the rates of

Table 2. Births per 100 couples by education of father and son.

EDUCATION OF FATHER	EDUCATION OF SON				
	College 3-4	College 1-2	High School 4	High School 1-3	Grade School 8
	BIRTHS PER 100 COUPLES				
College 1-4	193	}204	*	257	}225
High School 4	152		203	250	
High School 1-3	191	*	164	214	}221
Grade School 8	162	152	174	216	
Grade School 6-7	}162	*	185	194	188
Grade School 5 or Less		*	215	217	252
	NUMBER OF COUPLES				
College 1-4	42	}49	17	28	}20
High School 4	27		34	22	
High School 1-3	23	3	25	22	}135
Grade School 8	58	56	109	187	
Grade School 6-7	}34	11	34	53	49
Grade School 5 or Less		2	46	52	61

* Rate not shown if based on fewer than twenty cases.

¹⁶ To explain this exception involves accounting for the low fertility of non-
(Continued on page 78)

both up and down mobile couples are generally lower than those of nonmobile couples of similar occupations.

Reading Table 2 vertically provides a test of Hypothesis *a* with respect to educational mobility. Ten out of fourteen comparisons are consistent with the hypothesis that the families of upwardly mobile couples are smaller than those of socially nonmobile couples of similar status. Most of the exceptions occur among couples in which the husband failed to complete high school.¹⁷ Couples of downward educational mobility have higher rates than their "destination" controls in the three comparisons that can be made.

Except among clerical couples there is a reliable tendency for upwardly mobile couples to have smaller families than their "destination" controls. Twenty-one of twenty-eight comparisons in Tables 1 and 2 are consistent with Hypothesis *a*. One would expect this to result from chance only five per cent of the time.¹⁸ The inclusion of clerical couples increases the number of comparisons to 34 without adding to the number that are consistent with the hypothesis.¹⁹

Confidence in Hypothesis *a* is increased somewhat by the findings in Tables 3 and 4 where classifications are based upon the mobility of both husband and wife. The rates for nonmobile "destination" control groups are given in the left hand column.

mobile clerical couples as much as for the higher rates of mobile couples. Such an explanation evidently could not be given in terms of differential success in fertility planning, since similar differences are found among planned families (using a very loose definition of planned family: all couples exclusive of those classified as Excess Fertility). Socially mobile clerical couples whose families are planned in this broad sense have a birth rate of 152; clerical nonmobile of similar planning status have a rate of 111. This difference is significant at the 1 per cent level.

¹⁷ The question of what are the critical breaking points on the scale of educational attainment has been inadequately investigated. There is little doubt that our thinking about educational attainment is in terms of certain blocks of education, e.g., grammar school, high school, college, rather than in terms of units of one year. Certain general and changing norms function as criteria of success or failure within the educational rank system. It seems unlikely, for example, that a young adult classified in 1940 as having less than a high school education would perceive himself or be perceived as upwardly mobile even though his father had had only a grammar school education.

¹⁸ Probabilities were determined from the Statistical Sign Test. See Dixon, W. J. and Mood, A. M., *The Statistical Sign Test*. *Journal of the American Statistical Association*, 41, no. 236, December, 1946, pp. 557-566.

¹⁹ *P* in this case = .25.

INDEX OF SOCIO-ECONOMIC STATUS	MOBILITY STATUS OF HUSBAND AND WIFE		
	Nonmobile "Destination"	Upward Mobility	Downward Mobility
	BIRTHS PER 100 COUPLES		
(High)			
I	205 ^a	187	*
II	187	158	170 ^a
III	225	212	175
IV	246 ^a	214	209
(Low)			
V	340	304 ^b	344
	NUMBER OF COUPLES		
(High)			
I	21 ^a	40	0
II	24	36	24 ^a
III	20	42	40
IV	25 ^a	35	57
(Low)			
V	37	25 ^b	64

Table 3. Births per 100 couples by occupational mobility of the husband and wife and by index of socio-economic status of the couple.

^a Excluding intergenerationally nonmobile couples having some career mobility.

^b Includes some couples with only one member of upward mobility.

* Includes some couples with only one member of downward mobility.

* Rate not shown if based on fewer than twenty cases.

The columns to the right give the rates of couples of upward and downward mobility. Considering upward mobility alone, fifteen out of seventeen comparisons are consistent with Hypothesis *a*. If the downwardly mobile couples are included, nineteen of twenty-three comparisons are consistent. These results would be expected 1 per cent of the time if chance alone were operating.²⁰

Mobility in Relation to Number of Siblings. It is reasonable

²⁰ The nonmobile couples in Table 3 generally exceed mobile couples in amount of intragenerational mobility, if disparity between the husband's first and longest occupation is a valid index. Where possible (Socio-economic Status groups I and IV) nonmobile couples, in which the husband could be classified as *intragenerationally* mobile, were eliminated. In the three remaining socio-economic groups in which this kind of control could not be applied, due to large numbers of intragenerationally mobile couples, the extent of intragenerational mobility is greater among nonmobile couples than among couples of upward or downward mobility.

to suppose that children in small families tend to have better opportunities for schooling and more "advantages" in general than do children in larger families of roughly the same economic level. It may, therefore, seem reasonable also to suppose that the tendency for sons to rise above the occupational levels of their fathers is inversely related to the number of brothers and sisters of the "son." However, this assumption is not borne out by the data for the Indianapolis couples. In Appendix I, the percentage distributions of husbands by intergenerational mobility status are shown by number of "biological" and "sociological" siblings of the husband. The data are shown for the total group and for two subdivisions by occupational class of the father.

Hypothesis b—Size of Planned Families. The fact that mo-

Table 4. Births per 100 couples by educational mobility status of the husband and wife and by index of socio-economic status of the couple.

INDEX OF SOCIO- ECONOMIC STATUS	MOBILITY STATUS OF HUSBAND AND WIFE				
	Husband & Wife Nonmobile "Destination"	Husband & Wife Up Mobile	Husband Up Wife Non- mobile	Wife Up Husband Nonmobile	Husband & Wife Down Mobile ¹
	(1)	(2)	(3)	(4)	(5)
	BIRTHS PER 100 COUPLES				
(High)					
I and II	173	174	180	165	180
III	239	177	184	191	230
IV	229	190	220 ^a	222	268
V	335	310	308 ^a	291	404
	NUMBER OF COUPLES				
(High)					
I and II	26	87	40	26	30
III	28	35	25	35	20
IV	42	30	49 ^a	32	25
(Low)					
V	36	19	35 ^a	23	24

¹ Includes any instance of down mobility regardless of mobility of spouse.

^a Columns 3 and 4 combined.

INDEX OF SOCIO-ECONOMIC STATUS OF THE COUPLE	NONMOBILE "DESTINATION"	MOBILE	
		Upward	Downward
	BIRTHS PER 100 COUPLES		
(High)			
0-19	147	144	*
20-39	92	84	114
(Low)			
40 and Over	126	96	84
	NUMBER OF COUPLES		
0-19	32	55	15
20-39	26	76	65
40 and Over	27	29	51

Table 5. Births per 100 couples of "number and spacing planned" status, by intergenerational occupational mobility of the husband and index of socio-economic status of the couple.

* Rate not shown if based on fewer than twenty cases.

bile couples have been found to have a lower overall fertility rate than the nonmobile couples does not necessarily mean that a similar situation will hold for planned families alone. Table 5 is restricted to "number and spacing planned" couples and fertility rates of mobile couples are compared with those of nonmobile couples of the same general socio-economic level. The differences observed are small but they are consistent with Hypothesis *b* when upwardly mobile couples are considered. When downwardly mobile couples are taken into consideration, four of the five comparisons are consistent with Hypothesis *b*.²¹

Several other approaches to the problem of the relationship between mobility and size of planned family are presented in

²¹ If comparisons are made within each of five socio-economic levels it is necessary to expand the definition of "planned" families to include all couples in the first three planning groups if excessive unreliability in rates is to be avoided. Doing this reveals that seven out of ten comparisons are consistent with Hypothesis *b*. The major exceptions are found within the second highest socio-economic level (20-29). As in the case of nonmobile clerical workers, these exceptions are due in large part to the unusually low rates of nonmobile couples rather than to above average fertility on the part of mobile couples.

FERTILITY- PLANNING STATUS	BIRTHS PER 100 COUPLES		NUMBER OF COUPLES	
	Nonmobile "Destination"	Upwardly Mobile	Nonmobile "Destination"	Upwardly Mobile
Number and Spacing Planned	122	108	77	192
Quasi-Planned	215	183	57	215

Table 6. Occupation standardized birth rates for upward mobile and nonmobile couples, by fertility-planning status.

Tables 6-8. In Table 6 fertility rates for different mobility groups are presented for the "number and spacing planned," and the "quasi-planned" groups²² with control for occupation achieved through standardization. The differences found are again consistent with Hypothesis *b*. Table 7 shows the average number of children living at the time of the last intentional pregnancy, by mobility status and occupation of the husband.²³ Although there is probably a *post factum* tendency to report as "intentional" pregnancies that really were not planned, it is only the comparative and not the absolute size of the intended families that is of concern. Among professionals and proprietors the comparisons are consistent with Hypothesis *b* but this is not the case among clerical and skilled couples.²⁴

On the assumption that the relationship between fertility and

²² Rates for "number planned" couples are not given because of the small number of couples on which the occupation specific rates would have to be based. Throughout the Indianapolis Study it has been the practice not to report rates where *N* is less than 20.

²³ The distribution of all couples in relation to numbers shown in Table 7 is as follows:

Total Couples Shown in Table 7	368
Couples Having no "Intentional" Pregnancies	389
Down-Mobile Couples (Not Shown)	420
Father Farmer and Son Skilled or Semi-Skilled	168
Unskilled Nonmobile	8
No Father or Father's Occupation Unknown	88
Son: Farmer	3
TOTAL	1,444

²⁴ Among the thirty-one skilled upwardly mobile couples was one with eleven children. This happened to be a couple for which a duplicate card was prepared for the inflated sample. Were it not for this couple, there would be no difference in the figures for mobile and nonmobile couples in which the husband is a skilled worker.

OCCUPATION OF HUSBAND	CHILDREN PER 100 COUPLES		NUMBER OF COUPLES	
	Nonmobile "Destination"	Upwardly Mobile	Nonmobile "Destination"	Upwardly Mobile
Professional	67	58	21	64
Proprietor	83	65	36	49
Clerical	23	51	22	92
Skilled	64	97	28	31
Semiskilled	80	*	25	*

Table 7. Mean number of children living at time of last intentional pregnancy per 100 couples, by mobility status and by occupation of husband.

* Rate not shown if based on fewer than twenty cases.

social mobility is linear, the extent of childlessness among "relatively fecund" couples may also be taken as a partial index of

Table 8. Per cent childless by occupational and educational mobility status of the husband and wife, and by socio-economic status of the couple.

INDEX OF SOCIO- ECONOMIC STATUS	OCCUPATIONAL MOBILITY STATUS			EDUCATIONAL MOBILITY STATUS		
	Upward Mobility	Down- ward Mobility	Non- mobile "Destin- ation"	Upward Mobility	Down- ward Mobility	Non- mobile "Destin- ation"
	PER CENT CHILDLESS					
(High)						
I	10.0	*	9.5 ^a	{ 17.2	{ 13.3	{ 15.4
II	27.8	*	12.5			
III	11.9	12.5	10.0	17.1	5.0	3.6
IV	11.4	8.8	0.0 ^a	10.0	8.0	9.5
(Low) V	4.0	3.1	0.0	*	0.0	2.8
	NUMBER OF COUPLES					
(High)						
I	40	0	21 ^a	{ 87	{ 30	{ 26
II	36	24 ^b	24			
III	42	40	20	35	20	28
IV	35	57	25 ^a	30	25	42
(Low) V	25 ^a	64	37	19	24	36

^a Includes some couples with only one member of upward mobility.

^b Includes some couples with only one member of downward mobility.

* Excluding intergenerationally nonmobile couples having some career mobility.

* Rate not shown if based on fewer than twenty cases.

the size of planned families and one that is relatively free of the bias due to rationalization described above. In Table 8 the per cent childless is shown for various mobility groups classified by the Index of Socio-Economic Status. Twelve of fifteen comparisons are consistent with Hypothesis *b*.

If Tables 5-8 are taken together as somewhat different tests of Hypothesis *b*, their overall consistency can again be measured by the sign test. Out of twenty-six possible comparisons, twenty are consistent with the hypothesis. This would be expected to result from chance only one per cent of the time. The exceptions occur primarily in connection with downward mobility and within the clerical and skilled occupational groups. Thus, with the exceptions noted, it may be concluded that the data indicate a tendency for mobile couples to have smaller planned families than nonmobile couples of comparable socioeconomic status.²⁵

Occupational and Physical Mobility in Relation to Fertility. Although the preceding materials indicate that mobility and fertility are inversely associated, there are several exceptions and in numerous instances the differences are small. Basically, an interest in social mobility as an independent variable is an interest in the effects on fertility of a change in social milieu. If this interpretation is correct, any manipulation of the data that exaggerates the differences between mobile and nonmobile couples with respect to extent of change in social milieu, should result in more distinct fertility differentials between these groups. Such is the reasoning that led to the joint consideration of occupational and physical mobility. In Table 9 the fertility of couples who are both occupationally and physically nonmobile is compared with that of couples who have experienced both types of mobility. The number of residential moves

²⁵ It might be objected that the data in Table 8 do not provide a test of the size of planned families unless fertility planning status is also considered. If, in Table 8, only those comparisons are made where nonmobile couples are at least as effective as mobile couples with respect to fertility planning, five out of seven are consistent with Hypothesis *b*. This means that thirteen of eighteen possible comparisons are consistent with Hypothesis *b*, a result that might occur ten times out of 100 as the result of chance. If only upwardly mobile couples are considered, $P = .05$.

INDEX	OCCUPATIONALLY NONMOBILE		OCCUPATIONALLY MOBILE	
	0 Moves After Marriage	1 or More Moves After Marriage	0 Moves After Marriage	1 or More Moves After Marriage
Births Per 100 Couples	221	211	193	179
Per Cent Childless	3.1	7.4	8.3	13.0
Number of Couples	131	54	300	138

Table 9. Births per 100 couples and per cent childless by occupational and physical mobility: mobile and nonmobile matched for husband's occupation.

since marriage is the measure of physical mobility. An earlier study²⁶ found no relationship between physical mobility, measured in this way, and either size of family or fertility planning. Thus any relationship which may emerge will be attributable to the combined effects of both types of mobility.

Table 9 presents birth rates by four different mobility categories. In order to retain a control for socio-economic status, mobile and nonmobile couples were matched²⁷ for occupation. Both a *t* test and a test by means of chi square indicate that the

²⁶ Kantner, J. F. and Whelpton, P. K., Social and Psychological Factors Affecting Fertility, xvi. Fertility Rates and Fertility Planning by Character of Migration, Milbank Memorial Fund *Quarterly*, xxx, No. 2, April, 1952, pp. 152-187 (Reprint pp. 705-740).

²⁷ This was done by frequency distributions. The average age of wife at marriage for the occupationally mobile couples is 21.1 years; for occupationally nonmobile, 20.4 years. The matching was done by giving each group a similar occupational distribution. The percentage distribution by occupation is as follows:

	Per Cent
Professional	14.0
Proprietor	16.0
Clerical	21.0
Skilled	25.0
Semi-skilled	24.0
	<hr/> 100.0

These percentages were obtained by making those adjustments in the mobile and nonmobile distributions that would involve the least number of discarded cases. When the percentage distribution was determined, the punched cards for the groups from which cases were to be dropped were randomized and the required number of cases selected for discard by picking every *n*th card. The distribution by live births of the discarded and retained cards were then compared as a check on the procedure. No important differences were found.

MOBILITY STATUS	BIRTHS PER 100 COUPLES		NUMBER OF COUPLES	
	Test Group	Nonmobile "Destination" Control	Test Group	Nonmobile "Destination" Control
Upward Mobility	86	110	42	42
Downward Mobility	105	110	38	38

Table 10. Births per 100 "number and spacing planned" couples by occupational and physical mobility status: mobile and nonmobile couples matched for occupation of husband.

differences in the fertility of extreme mobility groups are significant at probabilities below the 5 per cent level.²⁸

A comparison of the extent of childlessness among these same groups (Table 9) again suggests that differences in size of planned families may be significant. Chance differences as large as those between extreme mobility groups in Table 9²⁹ would occur only once in every 100 samples. A more direct method of determining whether differences in size of planned families exist is employed in Table 10. Among "number and spacing planned" couples, the smallest families are those of upwardly mobile couples, followed in order of increasing size by downwardly mobile and nonmobile couples. As before, these groups are matched for the husband's occupation.³⁰

Fertility Comparisons with Greater Control for Socio-Economic Status. Thus far the data have been consistent, in general, with Hypotheses *a* and *b*. However, the controls for socio-economic status were such that the possibility of a certain amount of variation in this respect still existed. In this section the fertility of mobile and nonmobile couples, matched more precisely for differences in socio-economic status, will be com-

²⁸ In making both tests *N*s were reduced by the ratio of the uninflated to the inflated sample. The degree of relationship, as indicated by a Coefficient of Contingency (corrected for number of cells), is $-.33$.

²⁹ If differences in extent of childlessness for extreme mobility groups classified as "number and spacing planned" are considered, the percentages are as follows: Nonmobile 16.7 per cent; Mobile 45.2 per cent.

³⁰ Nonmobile couples were matched twice—once against upwardly mobile couples and again with downwardly mobile couples. The matching was by frequency distribution. Both occupational and physical mobility were employed as criteria of classification.

	UPWARDLY MOBILE ¹	NONMOBILE "DESTINATION" ²
Births Per 100 Couples	181	205
Birth Rate Standardized for Net Worth	181*	203
Number of Couples	37	37

Table 11. Crude and net worth standardized birth rates by occupational and physical mobility status of couples matched for occupation of husband and index of socio-economic status.

* Upwardly Mobile Couples used as standard.

¹ Husband upwardly mobile, two or more moves since marriage.

² Husband occupationally nonmobile, no physical mobility since marriage.

pared. Since the number of couples who survive the matching procedures is usually small, the comparisons must be confined, for the most part, to the size of families rather than to the size of planned families.

One procedure followed was that of selecting a number of couples representing extremes of mobility (occupationally and physically nonmobile vs. occupationally and physically³¹ mobile), to match by occupation within socio-economic groups,³² and finally to standardize the rates for the couple's net worth.³³ Table 11 presents both crude rates and rates standardized for net worth for the two groups. Socially mobile couples are seen to have lower fertility rates. This would not seem to be due to superior effectiveness in fertility planning for as may be seen in Table 12 these mobile couples may be even less effective in fertility planning.

To increase the precision of the controls for socio-economic status still more it was necessary to abandon the subclassification by physical mobility.³⁴ By comparing couples who differed

³¹ Two or more moves after marriage.

³² Groups established by Index of Socio-economic Status.

³³ "This term, as in business and financial usage, relates to the difference between assets and liabilities. It is the sum of each savings, market values of equities in real property, investments, business enterprises, and insurance policies, minus debts outstanding. Net worth was not asked as a single question but was computed on the basis of component data collected specifically for . . . such (a) computation." (Kiser, C. V. and Whelpton, P. K., ix, op. cit.)

³⁴ As noted above, the use of physical mobility as a criterion of classification, as in Table 11, was for the purpose of maximizing the variation to be explained. This was thought to be desirable in view of the homogeneity of the sample and the crudeness of measurement of the independent variable.

FERTILITY PLANNING STATUS	UPWARDLY MOBILE ¹	NONMOBILE "DESTINATION" ²
Number and Spacing		
Planned	28.6	38.9
Number Planned	14.3	5.6
Quasi-Planned	31.4	25.0
Excess Fertility	25.7	30.6
Total ³	100.0	100.1

Table 12. Per cent distribution by fertility planning status of upwardly mobile and nonmobile couples matched for occupation of husband and for index of socio-economic status.

¹ Percentages based on thirty-seven cases (See Table 11). ²

² Husband upwardly mobile, two or more moves since marriage.

³ Husband occupationally nonmobile, no moves since marriage.

only in terms of occupational mobility it was possible to apply additional controls. Individual matching³⁵ on three factors (occupation of husband, education of husband, and couple's net worth) was tried first. The rates for the mobility group thus matched are given in the first row of Table 13. The differences, expected on the basis of chance less than four per cent of the time, are consistent with Hypothesis *a*. Adding a fourth control (age of wife) does not change this conclusion. The same is true when control for a fifth factor, extent of career mobility,³⁶ is undertaken (row 3 of Table 13), although the groups are quite small. The rates in row 3 are for couples classified as having some career mobility.³⁷

These data, then, support Hypothesis *a*. To test Hypothesis *b* in the same way involves even smaller numbers than those already encountered. Being aware then of the probable unreliability of the rates, we may note that the mobile couples again

³⁵ Because of great anticipated shrinkage, matching was begun with the inflated sample. After matching by occupation, education and net worth, the occupational distribution of both mobile and nonmobile groups is as follows: Professional, 14 per cent; Proprietor, 24 per cent; Clerical, 20 per cent; Skilled, 40 per cent; Semi-skilled, 2 per cent. Only up-mobile couples are considered.

³⁶ A couple is counted as having some career mobility if the husband's first and longest occupational class differ.

³⁷ It would have been preferable to compare matched couples having no career mobility. Because of the smaller number of couples in this category such comparison could be made only by giving up some of the socio-economic controls. Eliminating the control for net worth and adding a control for "no career mobility" yields two small groups of twenty-five each. The intergenerationally mobile couples continue to have lower rates but the difference is small (184 vs. 196) and not reliable.

FACTORS MATCHED	BIRTHS PER 100 COUPLES		NUMBER OF COUPLES	
	Upward Occupational Mobility	Nonmobile "Destin- ation"	Upward Occupational Mobility	Nonmobile "Destin- ation"
1. Occupation of Husband				
2. Education of Husband				
3. Net Worth	174	205	81	81
1, 2, and 3 Plus				
4. Age of Wife at Marriage	177	219	65	65
1, 2, 3, and 4 Plus				
5. Some Career Mobility ¹	159	195	22	22
1, 2, and 3 Plus				
6. Fertility-Plan- ning Status	176	186	21	21

Table 13. Births per 100 couples by mobility status and type of matching.

¹ Husband's first and longest occupation differ.

have smaller families when differences in fertility-planning status³⁸ are taken into account (row 4 of Table 13). This is not an adequately refined test of Hypothesis *b*,³⁹ but the findings do increase confidence in the differences found under various forms of matching and this is perhaps the chief contribution of Table 13.

In general then, the further testing of Hypothesis *a* and to some extent Hypothesis *b* by the application of refined control procedures, has tended to increase rather than decrease, our confidence in these hypotheses. That the differences diminish

³⁸ It was impossible to consider differences between "number and spacing planned" couples alone, although more matches were found in this category than in any other, i.e., the modal fertility planning category in these groups is "number and spacing planned."

³⁹ Since later on we find only negligible differences in fertility planning status between various mobility groups, one might say that Hypothesis *b* has been repeatedly confirmed (as a relative but not as an absolute proposition concerning differences in family size in the absence of fertility planning differentials) by the data which supported Hypothesis *a*.

in size under such treatment may of course indicate the diminished importance of social mobility as a causal variable. It is important to realize however that this may also indicate a reduction in the variation between groups in degree of social mobility. The fact that social mobility is being measured non-quantitatively does not mean that we are not dealing with an underlying quantitative continuum. Matching may tend to move couples together on this continuum and thus to limit the amount of variation in behavior related to social mobility. This, of course, is merely a statement of the logic of tests of significance involving matched groups.

The Pattern of Family Growth. It is of interest to inquire at what period of the married life the previously observed fertility differentials emerge.⁴⁰ Table 14 indicates that, except where the husband is classified as a clerical worker, the percentage of couples refraining from reproduction in the first four years of married life is as great among upwardly mobile as among non-mobile couples of similar occupation. In Table 15, where a more stringent definition of mobility is employed, the association between social mobility and family limitation in this early period of family life is more clearly evident. Thus social mobility appears to be an important principle of classification, where fertility is being considered, at the onset of married life as well as after 12-15 years of marriage.

⁴⁰ An intimation of the answer to this question has already been given in the data on the extent of childlessness (Tables 8 and 9). There it will be recalled upward mobility was associated with family limitation. An interesting point, consistent with Hypothesis *a* but not previously mentioned, is that relatively more upwardly mobile couples than nonmobile couples who have no children during the early years of marriage, remain childless throughout subsequent periods. This is shown in the following table which shows for each mobility status and by occupation, the per cent of couples, childless during the first four years of married life, who remain childless:

OCCUPATION OF HUSBAND	NONMOBILE "DESTINATION"	UPWARDLY MOBILE
Professional	0.0	28.5
Proprietary	33.3	41.9
Clerical	27.3	41.3
Skilled	11.1	34.8

NUMBER OF BIRTHS	HUSBAND'S OCCUPATION							
	Professional		Proprietor		Clerical		Skilled	
	Up-ward Mobility	Non-Mobile	Up-ward Mobility	Non-Mobile	Up-ward Mobility	Non-Mobile	Up-ward Mobility	Non-Mobile
0	40.2	30.8	32.6	33.3	32.3	56.4	31.9	23.4
1	47.0	69.2	52.6	33.3	50.8	30.8	31.9	44.2
2 or More	12.8	0.0	14.7	33.3	16.9	12.8	36.1	32.5
Total Per Cent	100.0	100.0	99.9	99.9	100.0	100.0	99.9	100.1
Total Couples	117	26	95	54	195	39	72	77

Table 14. Fertility during the first four years of marriage by mobility status and husband's occupation.

Hypothesis c—Social Mobility and Effectiveness in Fertility Planning. As previously indicated, the last hypothesis to be considered in the present analysis is that "socially mobile couples are more effective in fertility planning than socially nonmobile couples of comparable status."

Throughout the Indianapolis Study the relationship of effectiveness of contraceptive practice to given variables has been tested by (a) classifying couples according to the variable considered and (b) comparing the resulting classes with respect to distributions by fertility-planning status. The categories

Table 15. Fertility during the first four years of marriage by occupational and physical mobility status: up mobile and nonmobile couples matched for husband's occupation.

NUMBER OF BIRTHS	OCCUPATIONALLY NONMOBILE		OCCUPATIONALLY UP MOBILITY	
	0 Moves After Marriage	1 or More Moves After Marriage	0 Moves After Marriage	1 or More Moves After Marriage
0	28.3	31.5	32.0	38.4
1	47.3	37.2	44.4	42.0
2 or More	24.4	31.4	23.7	19.6
Total Per Cent	100.0	100.1	100.1	100.0
Total Couples	131	54	300	138

OCCUPATION OF:		NUMBER OF COUPLES	PER CENT DISTRIBUTION BY FERTILITY PLANNING STATUS				
Father	Son		Total	Number and Spacing Planned	Number Planned	Quasi- Planned	Excess Fertility
Prof.	Prof.	26	100	50.0	15.4	30.8	3.8
Prop.	Prof.	42	100	42.8	2.4	52.4	2.4
Skilled	Prof.	24	100	37.5	25.0	8.3	29.2
Farmer	Prof.	28	100	50.0	7.1	21.4	21.4
Prof.	Prop.	24	100	37.5	33.3	12.5	16.7
Prop.	Prop.	54	100	44.4	16.7	16.7	22.2
Skilled	Prop.	28	100	32.1	14.3	28.6	25.0
Farmer	Prop.	32	100	31.2	9.4	43.8	15.6
Prof.	Clerical	20	100	25.0	25.0	20.0	30.0
Prop.	Clerical	84	100	26.2	20.2	35.7	17.8
Clerical	Clerical	39	100	41.0	10.3	25.6	23.1
Skilled	Clerical	65	100	30.8	16.9	27.8	24.6
Semisk.	Clerical	44	100	31.8	4.5	31.8	31.8
Unskilled	Clerical	24	100	4.2	12.5	45.8	37.5
Farmer	Clerical	62	100	35.5	6.4	32.2	25.8
Prop.	Skilled	43	100	27.9	9.3	23.2	39.5
Skilled	Skilled	77	100	24.7	11.7	18.2	45.4
Semisk.	Skilled	47	100	38.3	10.6	36.2	14.9
Unskilled	Skilled	25	100	24.0	0.0	64.0	12.0
Farmer	Skilled	62	100	24.2	12.9	41.9	21.0
Prop.	Semisk.	38	100	31.6	10.5	34.2	23.7
Clerical	Semisk.	20	100	25.0	0.0	45.0	30.0
Skilled	Semisk.	99	100	12.1	16.2	36.4	35.4
Semisk.	Semisk.	69	100	14.5	18.8	26.1	40.6
Farmer	Semisk.	106	100	20.8	15.1	37.7	26.4

Table 16. Fertility planning status by occupation of father and son.

relating to fertility-planning status are "number and spacing planned," "number planned," "quasi-planned," and "excess fertility."⁴¹

This procedure has been followed in the presentation of the basic data in Tables 16 and 17. However, in order to facilitate comparisons of the effectiveness of fertility control of the two types of socially mobile couples with the nonmobile couples of

⁴¹ The four categories have been described in footnote 11.

EDUCATION OF		NUMBER OF COUPLES	PER CENT DISTRIBUTION BY FERTILITY PLANNING STATUS				
Father	Son		Total	Number and Spacing Planned	Number Planned	Quasi- Planned	Excess Fertility
Col. 1-4	Col. 3-4	42	100	35.7	16.7	31.0	16.7
H.S. 4	Col. 3-4	27	100	44.4	11.1	33.3	11.1
H.S. 1-3	Col. 3-4	23	100	34.8	17.4	39.1	8.7
G.S. 8	Col. 3-4	58	100	53.4	6.9	15.5	24.1
G.S. < 6	Col. 3-4	34	100	41.2	20.6	38.2	0.0
Col. 1-4	Col. 1-2	35	100	45.7	8.6	28.6	17.1
G.S. (any)	Col. 1-2	69	100	46.4	7.2	27.5	18.8
H.S. 4	H.S. 4	34	100	20.6	17.6	32.4	29.4
H.S. 1-3	H.S. 4	25	100	16.0	16.0	40.0	28.0
G.S. 8	H.S. 4	109	100	36.7	15.6	31.2	16.5
G.S. 6-7	H.S. 4	34	100	32.4	23.5	38.2	5.9
G.S. < 6	H.S. 4	46	100	13.0	15.2	52.2	19.6
Col. 1-4	H.S. 1-3	28	100	14.3	28.6	28.6	28.6
H.S. 4	H.S. 1-3	22	100	13.6	0.0	40.9	45.4
H.S. 1-3	H.S. 1-3	22	100	0.0	9.1	63.6	27.3
G.S. 8	H.S. 1-3	187	100	19.8	15.0	37.4	27.8
G.S. 6-7	H.S. 1-3	53	100	22.6	17.0	24.5	35.8
G.S. < 6	H.S. 1-3	52	100	25.0	9.6	21.2	44.2
H.S. 1+	G.S. 8	20	100	35.0	10.0	10.0	45.0
G.S. 8	G.S. 8	135	100	28.9	8.1	34.8	28.1
G.S. 6-7	G.S. 8	49	100	16.4	18.0	21.3	44.3
G.S. < 6	G.S. 8	61	100	22.4	10.2	20.4	46.9

Table 17. Fertility planning status by education of father and son.

Col.—College
H.S.—High School
G.S.—Grade School

similar status at destination or origin, considerable reliance has been placed on the proportion of couples classified as "number and spacing planned" as an index of effectiveness, Tables 18 and 19.

The structure of Tables 18 and 19 is precisely similar to that of Tables 1 and 2. The italicized figures along the diagonal represent the proportions of couples classified as "number and spacing planned" (or as "planned families") among the non-mobile couples of given status. These italicized figures are the

OCCUPATION OF FATHER	OCCUPATION OF SON				
	Professional	Proprietary	Clerical	Skilled	Semi-skilled
	NUMBER AND SPACING PLANNED				
Professional	50.0	37.5	25.0	*	*
Proprietary	42.8	44.4	26.2	27.9	31.6
Clerical	*	*	41.0	*	25.0
Skilled	37.5	32.1	30.8	24.7	12.1
Semi-skilled	*	*	31.8	38.3	14.5
Unskilled	*	*	4.2	24.0	*
Farmer	50.0	31.2	35.5	24.2	20.8
TOTAL PLANNED FAMILIES (NUMBER AND SPACING PLANNED AND NUMBER PLANNED)					
Professional	65.4	70.8	50.0	*	*
Proprietary	45.2	61.1	46.4	37.2	42.1
Clerical	*	*	51.3	*	25.0
Skilled	62.5	46.4	47.7	36.4	28.3
Semi-skilled	*	*	36.3	48.9	33.3
Unskilled	*	*	16.7	24.0	*
Farmer	57.1	40.6	41.9	37.1	35.9

Table 18. Per cent of families that are planned by occupation of father and son.

* Rate not shown if base is less than twenty.

"destination controls" for vertical comparisons (within the columns). They are the "origin controls" for horizontal comparisons (within the rows). Within the columns the figures above the diagonal are those for couples of downward mobility and the figures under the diagonal are those for couples of upward mobility.⁴² Within the lines or rows, the figures at the left of the diagonal are those for couples of upward mobility and those at the right are for couples of downward mobility.

In the first place it may be noted that according to Table 18, couples of intergenerationally upward occupational mobility do *not* tend to be more effective in fertility planning than non-mobile couples of the same occupational class. In nine of ten

⁴² Again attention should be called to the fact that sons of farm owners are regarded as being of upward mobility if they attained professional, proprietary, or clerical status; nonmobile if they attained skilled or semi-skilled status; and of downward mobility if they became unskilled laborers.

EDUCATION OF FATHER	EDUCATION OF SON				
	Col. 3-4	Col. 1-2	H. S. 4	H. S. 1-3	G. S. 8
	NUMBER AND SPACING PLANNED				
College 1-4	35.7	45.7	*	14.3	{ 35.0
High School 4	44.4	*	20.6	13.6	
High School 1-3	34.8	*	16.0	0.0	
Grade School 8	53.4	{ 46.4	36.7	19.8	28.9
Grade School 6-7	*		32.4	22.6	16.4
Grade School < 6	41.2		13.0	25.0	22.4
	TOTAL PLANNED FAMILIES (NUMBER AND SPACING PLANNED AND NUMBER PLANNED)				
College 1-4	52.4	54.3	*	42.9	{ 45.0
High School 4	55.5	*	38.2	13.6	
High School 1-3	52.2	*	32.0	9.1	
Grade School 8	60.3	{ 53.6	52.3	34.8	37.0
Grade School 6-7	*		55.9	39.6	34.4
Grade School < 6	61.8		28.2	34.6	32.6

Table 19. Per cent of families that are planned by education of father and son.

* Rate not shown if base is less than twenty.

comparisons⁴³ the proportion of couples classified as "number and spacing planned" is lower for couples of upward occupational mobility than for the nonmobile control groups of similar status at destination. This type of result is contrary to the hypothesis. Ten of the eleven comparisons are in the same direction when proportions classified as "planned families" are considered.

Only slightly greater consistency with Hypothesis *c* is achieved when occupational mobility⁴⁴ statuses of husband and

⁴³ One tie not counted. It may appear from Table 16 that some support of Hypothesis *b* is to be found among skilled workers, primarily because of large differences in percentages of "excess fertility" couples. However this may represent merely a shift between the "quasi-planned" and "excess fertility" categories which in turn may represent differences in the definition of the situation (different tolerance limits for given family sizes, differences in post factum tendencies to rationalize behavior, etc.) as much as differences in effectiveness.

⁴⁴ As previously indicated the wife's occupational mobility is derived by comparison of her father's occupational class (while she was 6-16) with her husband's occupational class at interview.

wife are jointly considered and index of socio-economic status is held constant (Table 20).

Table 20. Fertility planning status, by mobility status of husband and wife and by index of socio-economic status.¹

FERTILITY PLANNING STATUS AND INDEX OF SOCIO-ECONOMIC STATUS	OCCUPATIONAL MOBILITY STATUS			EDUCATIONAL MOBILITY STATUS		
	Non- mobile "Des- tina- tion"	Upward Mobility	Down- ward Mobility	Non- mobile "Des- tina- tion"	Upward Mobility	Down- ward Mobility
<i>Number and Spacing Planned</i>						
I ^a and II	43.2	42.1	54.2	26.9	46.5	44.8
III	26.3	20.0	25.0	18.5	23.5	25.0
IV ^a	16.0	26.5	21.0	21.4	36.7	8.0
V	0.0	8.7	11.1	8.3	5.6	4.5
<i>Number Planned</i>						
I ^a and II	20.4	7.9	12.5	26.9	15.1	31.0
III	10.5	17.5	10.0	18.5	14.7	20.0
IV ^a	8.0	11.8	12.3	14.3	3.3	8.0
V	22.2	17.4	11.1	8.3	22.2	13.6
<i>Quasi-Planned</i>						
I ^a and II	22.7	34.2	29.2	30.8	27.9	6.9
III	26.3	25.0	45.0	37.0	32.4	35.0
IV ^a	28.0	26.5	38.6	33.3	20.0	40.0
V	27.8	30.4	20.6	33.3	27.8	13.6
<i>Excess Fertility</i>						
I ^a and II	13.6	15.8	4.2	15.4	10.5	17.2
III	36.8	37.5	20.0	25.9	29.4	20.0
IV ^a	48.0	35.3	28.1	31.0	40.0	44.0
V	50.0	43.5	57.1	50.0	44.4	68.2
<i>Total Number of Couples</i>						
I ^a and II	44	76	24 ^c	26	86	29
III	20	40	40	27	34	25
IV ^a	25	34	57	42	30	25
V	36	23 ^b	63	36	18	22

¹ The small numbers of couples represented in this table result from: (a) the exclusion, except where noted, of couples in which the mobility status of husband and wife differ; and (b) the fact that these data are from the uninflated sample.

^a Excluding intergenerationally nonmobile couples that are intragenerationally mobile.

^b Includes some couples with only one member of upward mobility.

^c Includes some couples with only one member of downward mobility.

Hypothesis *c* receives greater support with reference to inter-generationally upward mobility by education than by occupation. Nine of the fourteen comparisons in the upper section of Table 19 are consistent with the hypothesis that fertility planning status is more effective among couples exhibiting upward educational mobility than among nonmobile couples of comparable educational attainment. The data in Table 20, in which couples are classified by the joint mobility status of the husband and wife, are generally consistent with the hypothesis. It should be noted, however, that of the eighteen comparisons between mobile and nonmobile couples in Tables 19 and 20, only twelve are consistent with Hypothesis *c*, a result that might occur by chance 25 per cent of the time.

Thus, when nonmobile couples of similar status at "destination" are used as controls, the relationship of fertility-planning effectiveness is found to be closer to upward educational mobility than to upward occupational mobility. However, even with respect to upward educational mobility, the reliability of the results is low.

It is possible that the lack of positive results in the occupational data arises partly from the indeterminate comparability of ages of fathers and sons. The lack of stronger relationships than those actually found in the educational data may suggest that even if mobility stimulates fertility-planning effectiveness, an *inertia* of certain habits may prevent socially mobile couples from overtaking their destination controls with respect to fertility planning.

There is little doubt, however, about the couples of upward mobility (occupationally or educationally) being more effective in fertility planning than are nonmobile couples of similar origin. This is apparent by horizontal comparisons in Tables 18 and 19. (In any given row the figures at the left of the italicized diagonal tend to be higher than the italicized figure.) Thus, among sons of skilled workers, the proportion classified as number and spacing planned extends from about 31 to 38 per cent for those who advanced to higher occupational levels, as

compared with 25 per cent for those who duplicated their father's occupational class. Altogether, thirteen of fifteen comparisons⁴⁵ of this type in Tables 18 and 19 are consistent with the hypothesis. This might occur as the result of chance only 1 per cent of the time.

Nevertheless, it is important to emphasize that comparisons of the above type do not really afford much support to any hypothesis on social mobility. These comparisons simply reaffirm, with some refinement, the traditional direct relation of fertility-planning status to occupational or educational attainment. They permit us to say that *among couples whose parents were of similar occupational or educational attainment* fertility-planning status varies directly with occupational or educational status of the couples.

Downward Mobility. There is some tendency, by no means universal, for the fertility planning effectiveness of couples of downward social mobility to fall between that of their origin and destination groups. This is illustrated by the following, derived from Tables 18 and 19. Couples of downward mobility

OCCUPATION OF		PER CENT CLASSIFIED	
Father	Son	Number and Spacing Planned	Number Planned
Proprietor	Proprietor	44.4	61.1
Proprietor	Skilled	27.9	37.2
Skilled	Skilled	24.7	36.4
H.S. 4	H.S. 4	20.6	38.2
H.S. 4	H.S. 1-3	13.6	13.6
H.S. 1-3	H.S. 1-3	0.0	9.1

are clearly less effective fertility planners than their origin groups.⁴⁶ Only 1 per cent of the time would we expect these

⁴⁵ Counting father G.S. 6-7 and son G.S. 8 as nonmobile relative to cases with father G.S. 6-7 and son H.S. 1-3 or above.

⁴⁶ Couples in which the husband is Grade School 8 and College 1-2 and whose fathers were respectively "High School 1 and above" and "College 1-4" are actually more effective than their origin groups. These cases are not included in the tally because of doubt that the latter category represents downward mobility, and because of the small number of couples involved in the former.

FERTILITY PLANNING STATUS	OCCUPATIONALLY NONMOBILE		OCCUPATIONALLY MOBILE	
	0 Moves After Marriage	1 or More Moves After Marriage	0 Moves After Marriage	1 or More Moves After Marriage
Number and Spacing Planned	29.9	30.0	29.0	36.0
Number Planned	13.2	22.0	14.1	11.0
Quasi-Planned	20.5	26.0	34.7	36.7
Excess Fertility	36.3	22.0	22.2	16.2
TOTAL	99.9	100.0	100.0	99.9

Table 21. Per cent distribution by fertility planning status by occupational and physical mobility of husband.¹

¹ For totals on which percentages are based see Table 9.

results—nine out of nine comparisons—to be due to chance. When comparisons are made with destination groups we do not find that couples of downward mobility plan fertility more effectively. Only eleven of eighteen comparisons in Tables 18, 19, and 20 are consistent with Hypothesis *c* as it relates to downward mobility.

Occupational Mobility, Physical Mobility, and Fertility Planning. Since the sharpest fertility differentials were found in conjunction with the consideration of both occupational and physical mobility, it was decided to examine Hypothesis *c* in a similar way. The results of this procedure are presented in Table 21, control for socio-economic status being achieved through matching for occupation.⁴⁷ These data are consistent with Hypothesis *c*. However, if chi square is reduced by the ratio of the uninflated to the inflated sample, these differences might be expected to occur through chance between five and ten per cent of the time. Even so, one might be reluctant to dismiss these results if it were not for the fact that the greatest contributions to chi square come from the discrepancies between observed and expected frequencies within the "quasi-planned" and "excess fertility" groups. As suggested previously, this might be as much a matter of how the family size situation

⁴⁷ See footnote 27.

Table 22. Regularity of contraception during months in which conceptions occurred, by occupation and mobility status of husband.

REGULARITY OF CONTRACEPTION	OCCUPATION OF HUSBAND							
	Professional		Proprietary		Clerical		Skilled	
	Upward Mobility	Nonmobile "Destination"	Upward Mobility	Nonmobile "Destination"	Upward Mobility	Nonmobile "Destination"	Upward Mobility	Nonmobile "Destination"
"Always" or "Usually"	34.8	0.0	42.5	20.0	30.5	19.1	37.4	26.7
"Sometimes" or Irregular	58.0	84.7	50.0	73.3	65.2	61.8	54.2	63.3
No Contraception	5.8	15.2	7.6	6.7	4.3	19.1	8.3	6.7
Other	1.4	—	—	—	—	—	—	3.3
TOTAL	100.0	99.9	100.1	100.0	100.0	100.0	99.9	100.0
Number of Couples ¹	69	13	66	30	138	23	48	60

¹ Never pregnant couples, number and spacing planned couples, and couples classified as unknown with respect to contraceptive regularity excluded.

is defined as an indication of differences in effectiveness. Thus we must conclude that no statistically reliable evidence for Hypothesis *c* has been found.

Regularity of Contraception. The conclusion that couples of upward mobility are not more effective in fertility planning than their nomobile "destination" controls is strengthened by showing that couples of upward mobility appear to have employed contraception with greater regularity than nonmobile couples during months in which conceptions have occurred. This is, obviously, an additional indication of ineffective planning,⁴⁸ since pregnancies occurring despite contraceptive practice are accidental. Table 22 contains data that reveal marked differences between upwardly and nonmobile couples in contraceptive regularity during months in which conceptions have occurred.

The data in Table 22 are susceptible to further interpretation if one assumes that for couples who use contraceptives ineffectively, contraceptive regularity during the months sampled is representative of general contraceptive practice. If this is accepted we have a clue to the fact that upwardly mobile couples have smaller families in spite of their showing no demonstrable superiority in fertility planning status. In addition to a tendency for mobile couples to have smaller planned families it seems likely that persistent, though partially unsuccessful, contraception may be a factor in the lower birth rates of mobile couples. Regularity is, perhaps, an initial phase in the development of effective fertility management.

SUMMARY

The answer to two of the general questions of this analysis seems clear: social mobility, especially upward mobility, is a significant principle of classification with respect to size of family and size of planned families.

Although exceptions have been noted, the data support Hy-

⁴⁸ This assumes no greater candor in responding to this question on the part of upwardly mobile couples whose pregnancies were not planned.

pothesis *a* in that families exhibiting intergenerational upward mobility tend to be smaller than nonmobile couples of comparable status. Within the same limits they support Hypothesis *b* in that similar results are found when the analysis is restricted to planned families.

Hypothesis *c* was not confirmed as originally stated. However, at least in the case of upward mobility, the data are not inconsistent with the view that mobility partially overcomes resistances to contraception, giving upwardly mobile couples a position intermediate in fertility planning effectiveness between the levels of effectiveness of origin and destination groups. Consistent with this view also is the greater regularity of contraception among upwardly mobile couples. This is taken as an indication of the desire to regulate reproduction but a desire that apparently is handicapped by relatively ineffective practice.

Appendix I. Percentage distribution of husbands by intergenerational occupational mobility status, according to number of husband's "biological" and "sociological" siblings, and by broad occupational class of the father.

INTERGENERATIONAL OCCUPATIONAL MOBILITY STATUS OF HUSBAND	ALL COUPLES ^a	NUMBER OF SIBLINGS OF THE HUSBAND					
		"Biological" ^b			"Sociological" ^b		
		0	1-2	3+	0	1-2	3+
<i>Total Group</i>							
Number (Percentage Base)	1,353	138	496	719	165	592	588
<i>Per Cent:</i>							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.1
Upward Mobility	32.6	27.5	36.9	30.6	30.3	35.3	30.8
Nonmobile	38.4	41.3	37.3	38.7	36.4	38.2	39.5
Downward Mobility	29.0	31.2	25.8	30.7	33.3	26.5	29.8
<i>Father "White-Collar Worker"</i>							
Number (Percentage Base)	469	60	201	208	77	227	160
<i>Per Cent:</i>							
Total	99.9	100.0	100.0	100.0	100.0	100.0	100.1
Upward Mobility	6.8	8.3	7.5	5.8	7.8	6.6	6.9
Nonmobile	39.4	51.7	41.3	34.1	41.6	43.2	34.4
Downward Mobility	53.7	40.0	51.2	60.1	50.6	50.2	58.8
<i>Father "Manual Worker" or Farmer</i>							
Number (Percentage Base)	884	78	295	511	88	365	428
<i>Per Cent:</i>							
Total	100.0	100.0	100.0	100.0	100.0	100.1	100.0
Upward Mobility	46.3	42.3	56.9	40.7	50.0	53.1	39.7
Nonmobile	37.9	33.3	34.6	40.5	31.8	35.2	41.4
Downward Mobility	15.8	24.4	8.5	18.8	18.2	11.8	18.9

^a Relates to inflated sample but excludes (a) eighty-one cases in which husband had no father while he was 6-16, and (b) ten cases of unknown occupation of the father or son. Total includes eight unknowns with reference to "sociological" sibs.

^b As defined in the Study, "biological sibs" are all full brothers and sisters; "sociological sibs" are brothers and sisters (full, step, adopted) sharing the individual's household while the individual was 6-16 years of age.

ANNOTATIONS

THE AFRICAN MIND IN HEALTH AND DISEASE A STUDY IN ETHNOPSYCHIATRY¹

UNDER the auspices of the World Health Organization, Dr. J. C. Carothers has made a study of the outstanding features of African mentality in health and disease. Knowledge of Dr. Carothers' background reveals that he is eminently qualified to undertake a work of such scope. After receiving a medical degree in England, he returned to Africa and spent nine years in Kenya as Medical Officer of the Government. He was then put in medical charge of the Mathari Mental Hospital and of a prison in Nairobi, positions he held for twelve years.

The word African, as used by the author, refers to the Negro, the Nilotic Negro, and the Bantu Negro. These three groups, numbering 110,000,000 persons, comprise the vast majority of the population living south of the Sahara.

Dr. Carothers discusses certain factors found in the African environment and analyzes their meaning and importance for African psychiatry. Comprehension of the role played by infective, nutritional and cultural factors is necessary if any real understanding of the African is to be attained. It appears that the African is seldom free from infection, some of the commoner ones being syphilis, trypanosomiasis, malaria, pneumonia, tuberculosis, bilharziasis, hook worms, dysentery, relapsing fever, ascariasis, and taeniasis. "Few Africans are free from all of these, and it would be easy to find examples of persons infected concurrently with malaria, hookworm, bilharziasis, ascariasis, and taeniasis, with a hemoglobin level of

¹Carothers, J. C.: *THE AFRICAN MIND IN HEALTH AND DISEASE, A STUDY IN ETHNOPSYCHIATRY*. World Health Organization, Palais des Nations, Geneva, Monograph Series No. 17, 1953, 177 pages.

about 30 per cent, and yet not complaining of ill-health." These infections are of psychiatric importance in that the general ill health and debility that they produce often pave the way for the development of mental illness.

Like infectious disease, malnutrition is widespread and may be of such severity that mental and physical health are impaired. Not only is the average African usually infected with several types of parasites, but he also suffers from multiple deficiencies. South of the Sahara, the native population is principally vegetable-eating, and their diets are lacking in animal protein, fats, vitamin A, and some of the constituents of the vitamin B complex. According to the author, The British Committee on Nutrition in the Colonial Empire expressed the general situation by saying that "diets are very often far below what is necessary for optimum nutrition. This must result not only in the prevalence of specific deficiency diseases but in a great deal of ill health, lowered resistance to other diseases, and a general impairment of well-being and efficiency." As the author points out, this impairment is preponderantly mental. While the African suffers from numerous deficiencies, the most outstanding of these is a nutritional disease called kwashiorkor. Some of the end products of this disease which afflicts children are retarded growth, cellular necrosis, and other pathological changes in the liver, dermatoses, edema, and gastro-intestinal disorders. Among adults, chronic malnutrition results in pellagra, cirrhosis of the liver, adrenal abnormality, chronic pancreatitis, and anemia, to name just a few, and it is probable that some of these illnesses are the consequence of subclinical cases of kwashiorkor.

The author then presents a detailed examination of the African's culture. From a very early age the child is taught the importance of family connections. He is given thorough training in deportment and must act in a prescribed manner toward his relatives, both living and dead. All the local myths, taboos, rigid traditions, and regulations are imposed upon him and for every situation that may arise, he is taught a specific mode of response. There is no logic, truth, right or wrong, but only prescribed forms of behavior. The child's questioning evokes answers that are in animistic or magical

terms and which permit of no alternatives. Thus interest and curiosity are stifled; speculation, further personal development, initiative, and versatility are thoroughly thwarted. Through adolescence all training is directed toward the goal of mental uniformity and the complete integration of the individual into this rigid and inflexible society. While the African becomes socially integrated, personal integration is never achieved. In adulthood, conformity is the guiding rule of life. Lack of personal integration is seen in the African's impulsive and superficial handling of a new situation for which there is no prescribed mode of behavior.

Keeping the cultural background very much in the foreground, Dr. Carothers proceeds to a discussion of the African mind. The author offers, with no apologies, some "classical conceptions" about African mentality which he believes to be generally true. The African is ". . . conventional; highly dependent on physical and emotional stimulation; lacking in spontaneity, foresight, tenacity, judgment, and humility; inapt for sound abstraction and for logic; given to phantasy and fabrication;" and is ". . . unstable, impulsive, unreliable, irresponsible, and living in the present without reflection or ambition, . . ." He is also ". . . cheerful, stoical, self-confident, sociable, loyal, emotionally intuitive, . . ." and has ". . . an excellent memory, a large vocabulary, and an aptitude for music and the dance." It is the author's belief that while all of these conceptions about the African are valid, they are by no means inherent features of personality, but rather are culturally determined. Carothers stresses the importance of environmental factors and feels ". . . that the characteristic mentality of the African is mainly, if not wholly, due to these."

The author then discusses psychiatry in Africa. The incidence of insanity in rural Africa is considerably lower than in England and Wales. To cite one example, among Kenya Africans the incidence of insanity was approximately 0.37 per 1,000 population as compared to the British figure of 3.9 per 1,000 population.

Schizophrenia is the most frequent form of psychosis found in Africans. In South Africa, in 1950, 67.5 per cent of 7,782

mentally deranged patients had some form of schizophrenia. It is interesting to note that the cultural background of the African plays an important part in his psychotic reactions. Because of the lack of personal and intellectual integration, the systematic and analytic arguments commonly used by schizophrenics in support of their convictions are lacking in the African.

The figures for manic-depressive psychosis are low but when these figures are given separately for the manic and depressive forms, the manic state predominates. Psychotic depression of any sort is rare in the African and once again the answer may lie in the culture. It is the author's belief that for depression to develop, some degree of personal integration and a sense of responsibility are necessary and the African is lacking in both of these attributes.

Regarding the psychoneuroses, hysteria is the most frequent form of neurotic behavior in Africa. There are, however, many psychiatric cases that are unclassifiable in terms of the standard categories. There are several reasons for this. The patient's past history is often unobtainable, and there is also a considerable language problem due to the different dialects spoken. The factor of "disavowal" further complicates history-taking. When an African recovers from a confusional state, he denies its occurrence and refuses to discuss it lest he call back the evil spirits that produced it.

It can be seen how profoundly African life is affected by infective, nutritional and cultural factors. "It may well be surmised that when there occurs some freedom from malnutrition and infection, and when other circumstances are propitious, African society can rise to splendid heights, . . ."

KATHERINE SIMON

. . .

PROSPECTS OF FURTHER DECLINE IN MORTALITY RATES¹

DURING the past two decades the mortality rates of the total population have declined greatly. However, greatest in-

¹ Dorn, Harold F.: Prospects of Further Decline in Mortality Rates. *Human Biology*, December, 1952, xxiv, No. 4, pp. 235-261.

creases have occurred in the lower age groups so that concern is now centered about the death rates of people above middle age.

The type of forecasts of mortality rates varies with the purpose for which the data are used. Leaders in public health and medicine are concerned with the effect of the greater spread of medical knowledge upon the mortality rates. Mortality is one of the components of population growth; so forecasts of longevity are attempted by those concerned with population growth. Insurance companies need a conservative basis upon which to estimate annuity premiums and reserves; these change as do the mortality rates.

As Dr. Dorn indicates, analyses of age-specific mortality rates can be presented in three ways. The generation approach (in which the date of birth remains constant as the age varies); the time series (in which age remains constant as the date of birth varies); and the synthetic cohort or life-table approach depicting the rates at each age during a specified time interval.

In the past the decline in mortality rates has largely been due to improvements in sanitation, the more widespread acceptance of immunization, improved personal hygiene, and a general rise in the level of living. Until ten or fifteen years ago relatively little of the decline could be attributed to advances in medicine and surgery, apart from preventive medicine. According to Dr. Dorn, however, advances in these fields will be the dominant factors in the future declines in mortality. However, he does not expect the declines of the future to equal those of the past in the United States. For this reason he states that projections based upon past mortality rates are likely to be inadequate. Application of the lowest age-specific death rate of either a foreign country or a state may also be inaccurate.

Since the absolute level and the trend varied greatly for different classifications of the total population, Dr. Dorn projected mortality rates separately for white males, white females, non-white males, and nonwhite females. For each group mortality rates were projected to 1960 and 1970. His projections are based upon annual rates of decrease in mortality rates for specific ages during the interim from 1936-1938 to 1946-1948; during this period medical knowledge became increasingly im-

portant, and death rates decreased more after 1935 than prior to that date.

Mortality rates for the early years of life are already so low that even large relative decreases will affect life expectation only slightly. In order to achieve as great an increase in the average longevity for the total population during the next two decades as has occurred in the past twenty years, the mortality rates for later adult life will have to decline considerably. Accidents, cancer, and cardiovascular-renal diseases account for more than two-thirds of all deaths above the age of 50; therefore, increased longevity depends much upon the lowering of death rates from these causes. For the nonwhite population the death rates from accidental causes decreased for all age groups during the past decade. For the white population, death rates from accidents are lower than a decade ago except for persons 15-24 years of age.

As for cardiovascular-renal diseases there has been a considerable decline in the death rates for all except the white male population. Although the rates have decreased for white males below the age of 35, they have continually increased for older white males during the past three decades.

The possibility of lower death rates from cancer does not appear very promising. "The most that can be expected is a cessation of the steady increase for the male population with some slight decrease in rates for females, especially white females." (p. 250)

Dr. Dorn's projections of age-specific mortality rates to 1960 and 1970 yield the life expectations at birth which are given below along with those for 1929-31 and 1948. According to these figures the increase during the next twenty years in life expectation at birth will be less than the increase during

YEAR	WHITE		NONWHITE	
	Male	Female	Male	Female
1929-1931	59.1	62.7	47.6	49.5
1948	65.5	71.0	58.1	62.5
1960	67.9	74.2	63.6	67.9
1970	69.8	76.4	66.9	71.4

the past twenty years. For whites it will be considerably less.

With respect to the future growth of our population, it may be noted that existing mortality rates for the whites are already so low that a further decline would affect population growth only slightly. Yet, if the birth rate were to drop to its 1940 level, the trend in mortality rates would be the main factor influencing the future size of the total population.

According to Dr. Dorn, the most important demographic effect of the declining mortality rates perhaps will be its influence on age distribution. If gains from immigration remain insignificant and if fertility rates are approximately at replacement level, the projected trends of mortality rates for white females to 1970 would yield a virtually rectangular age distribution until the age of 80. Under these assumptions the stationary population resulting from mortality rates of 1970 would be about 7.6 per cent greater than that resulting from 1948 mortality rates. "For nonwhite males the corresponding increase would be 15.3 per cent, showing that the trend in mortality is still an important factor in the growth of nonwhite population."

LILA M. FISCH

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THE CANADIAN SICKNESS SURVEY 1950-51¹

THE Canadian Sickness Survey is unique in that it was the first morbidity survey made by monthly visits over a period of a year on a national level. The survey was begun in the fall of 1950 "to obtain estimates of the incidence and prevalence of illness and accidents of all kinds, the amount of medical, nursing, and other health care received, and the volume of family expenditures for the various types of health services." The

¹ Peart, A. F. W.: Canada's Sickness Survey. Review of Methods. *Canadian Journal of Public Health*, October, 1952, pp. 401-414.

The Dominion Bureau of Statistics and The Department of National Health and Welfare. Canadian Sickness Survey 1950-1951, Special Compilation: No. 1. Family Expenditures for Health Services. Ottawa, Canada, May, 1953, 13 pp.

The Dominion Bureau of Statistics and The Department of National Health and Welfare. Canadian Sickness Survey 1950-1951, Special Compilation: No. 2. Family Expenditures for Health Services by Income Groups. Ottawa, Canada, July, 1953, 13 pp.

The Dominion Bureau of Statistics and The Department of National Health and Welfare. Canadian Sickness Survey 1950-1951, Special Compilation: No. 3. Family Expenditures for Health Services by Expenditure Group. Ottawa, Canada, September, 1953, 56 pp.

survey was planned and organized by the Department of National Health and Welfare in conjunction with the Dominion Bureau of Statistics and carried out by the ten provincial health departments with federal funds made available to the provinces through the National Health Program.

The morbidity data were collected from a probability sample of approximately ten thousand private households (forty thousand persons) which represented the population throughout the ten provinces of Canada. The sample was designed "to obtain estimates within a sampling error of twenty per cent for events occurring at least once among every fifty persons in the population during the year." Reports were issued monthly by the provincial survey directors to show any changes in the sample composition. The over-all refusal rate was approximately five per cent and of the remaining households over eighty per cent of the individuals involved remained in the sample throughout the entire survey period.

Uniformity in practice was maintained by the use of three standard record forms: a household record card which contained basic household and environmental data; an individual sickness record which contained all sickness data for an individual for the study year; and an expenditure form which contained all health expenditures for the family unit. In addition two standardized supplementary forms were included: a record of permanent physical disabilities and a record of health services which were desired but not obtained.

Uniform instructions to enumerators were issued although the hiring and training of enumerators was carried out at the provincial level. A total of fourteen visits were made to each household by the enumerators: one to introduce the survey; twelve at monthly intervals to record the sickness experienced in the household; and a final visit to check the information collected on the preceding twelve visits.

The figures presented in the reports are estimates, for the whole of Canada, of family expenditures for various items of health care and service during the twelve month survey period. The estimates have been calculated from tabulations of the data obtained from families who remained in the sample throughout the survey year.

Three preliminary reports on family expenditures for health services have been published which were prepared jointly by the Dominion Bureau of Statistics and the Department of National Health and Welfare. The first report contains general information on estimated family expenditures for various items of health care and service as well as estimated expenditures by size of family unit; the second report contains expenditures by the various income groups; and the third report gives the distribution of family units by expenditure groups for various items.

A family unit was defined as a husband, wife, and their children. All other persons were classified as separate family units. The figures given in all three reports are provisional in that they are subject to minor adjustments due to changes in estimating procedures for the provinces. The expenditures recorded in the survey were actual payments made during the twelve-month period by persons in the sample for health care and services regardless of bills received, charges made, or when the purchased service was actually received.²

The first report on the results of the Canadian Sickness Survey entitled "Family Expenditures for Health Services" gives the total estimated expenditures for health services throughout Canada as \$373,800,000. Of this amount 24 per cent was spent on prepayment plans and 76 per cent in direct payments. Of the total expenditures 19 per cent was for medicine; 24 per cent for hospital care; 27 per cent for physicians' services; 12 per cent for combined services (hospital and physician); and 18 per cent for "all other services" which included dental, eye, and nursing care, appliances and equipment. Of the total 4,555,000 family units, 86 per cent had some expenditures by at least one member of the family. The estimated average annual expenditure per family unit for all items of health service was \$82.10 and per family unit with expenditures, \$95. The average annual expenditures increased as the size of family increased up to the five to six person family and then decreased in families of seven or more persons.

² All of the estimated expenditures shown are based on actual expenditures by families or individuals and should not be confused with the total costs of the various health services.

The second report is entitled "Family Expenditures for Health Services by Income Groups." Family income was defined as the "total income for all members of the family unit taken together." Families were asked to state into which of five income groups they fell: under \$1,500, \$1,500-\$2,999, \$3,000-\$4,999, \$5,000 and over, and no income. Estimates of health expenditures are presented for the first four of these income groups separately, and, under "all incomes," for all five income groups together including those whose income was not stated. In each income group the largest proportion of the total expenditures for health services was in direct payment for services, 53 to 54 per cent in the lower three income groups and 60 per cent in the income group "\$5,000 and over." Prepayment plans accounted for only 15 per cent of the total expenditure in the income group "less than \$1,500," 23 per cent in the income group "\$5,000 and over," and 25 and 28 per cent respectively in the income groups "\$1,500-\$2,999" and "\$3,000-\$4,999." The lowest income group spent proportionately more for drugs and appliances than did any of the other three income groups, 28 per cent compared to 15 to 20 per cent in the other groups. For "all incomes" approximately one fourth of the total expenditures were for prepayment plans, one half in direct payment for services, one fifth for drugs and appliances, and the remainder for "other services."

The proportion of the total family units which reported expenditures for any item of health service increased as income increased: from 80 per cent of the family units in the lowest income group reporting expenditures to 97 per cent in the highest income group. The estimated average annual expenditure per family unit with expenditures also increased as income increased, from \$58 in families with incomes "under \$1,500" to \$164 in families in the "\$5,000 and over" group.

The third report entitled "Family Expenditures for Health Services by Expenditure Group" gives the distribution of family units by expenditure group for the various items of health service. The material is presented in three main sections: (1) the distribution of family units by expenditure group, (2) the distribution of family units by expenditure group and size of family unit, and (3) the distribution of family units by expen-

diture group and income group. Of the estimated total family units 14 per cent had no expenditure; 59 per cent expenditures from \$1 to \$99; 18 per cent, from \$100-\$199; and 9 per cent, \$200 and over.

The second section shows that as family size increased, expenditures for health services increased. For example, only 4 per cent of one person families had expenditures of \$200-\$499, whereas 29 per cent of the families with five or more persons fell into that expenditure group. Thirty-seven per cent of the one person families had no health expenditures and only 2 per cent of the families with five or more persons had none.

The third section of the report shows that as income increased the proportion of families with high expenditures increased. For example, in families with incomes "under \$1,500" only 4 per cent had health expenditures of from \$200-\$499 whereas 17 per cent of the families with incomes of "\$5,000 and over" were in that expenditure group. Twenty per cent of the families with incomes "under \$1,500" had no expenditure whereas only 3 per cent of the families with incomes of "\$5,000 and over" had no expenditure. Each section of this third report gives data on expenditures by family units in a detailed breakdown by expenditure item.

These three preliminary reports are part of a series intended to provide interim information on the more important results of the Canadian Sickness Survey. They precede the publication of a final report which is to contain more detailed information together with a fuller description of the methods used. The Canadian Sickness Survey was a comprehensive morbidity survey on a national level which provided information "essential for the effective planning of both medical care and public health programs."

JANE COULTER MERTZ

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EVALUATION OF THE PHYSICAL FITNESS OF PRESENT-DAY INDUCTEES¹

THE inadequacies of the method of distributing manpower among the various branches of the Armed Forces led the

¹ Karpinos, Bernard D.: Evaluation of the Physical Fitness of Present-Day Inductees. *U. S. Armed Forces Medical Journal*, March, 1953, iv, No. 3, pp. 415-430.

United States Army to adopt a new system of evaluating physical fitness of inductees. Although the need for a change in procedure was recognized at the outset of World War II, the present "profile" system was not adopted until 1944 when the critical shortage of men in the Army Ground Forces necessitated an immediate change. The PULHES system is essentially the same as the PULHEMS system which had previously been developed by the Canadian Army. It is designed to yield a "concise descriptive evaluation of a person's physical capacities from a functional . . . point of view . . ." This system replaced one in which occupational skill and intelligence alone determined placement. It was hoped that the new system would reduce the possibility of too many men of high physical fitness being assigned to noncombatant jobs where requirements for physical fitness were least stringent. Conversely, the new system was designed to reduce the possibility of too many men of low physical stamina being assigned to the combat duty and other heavy work of the Ground Force.

The separate factors of the PULHES system and some examples of what they cover are as follows: P—physical capacity or stamina (age, height, weight, muscular coordination); U—upper extremities (use of hands, arms, spine, range of motion); L—lower extremities (use of feet, legs, lower back); H—hearing; E—eyes; S—neuropsychiatric (emotional stability, personality and psychiatric history).

Each of the factors is graded from 1 to 4, with 1 representing above-average efficiency and 4 indicating capacities below minimum requirements. The profile serials are then grouped in four categories called A, B, C, and E. The physical categories of A, B, C, and E are defined as profiles in which the lowest ratings are 1, 2, 3, and 4, respectively. Thus a profile of C might be 211113.

The PULHES system differs from the PULHEMS, the one developed by the Canadian Army, in which the M or "mental status" is derived separately. The United States Armed Forces Qualification Tests (AFQT), given at the initial examinations of the inductee, contain questions on the meanings of words, arithmetic problems, and problems dealing with forms and patterns. The examinees are divided into five groups ranging

from very rapid learners (Group 1) to very slow learners who are unsuitable for military service (Group V).

The United States inductee is given a double classification, i.e., A-I (physical category A and mental group I). This separation of the mental and physical factors is important since different jobs require varying balances between physical and mental qualifications. Another advantage of the separation is that although physical requirements for the Army appear to have reached a stabilized level, intelligence requirements are relatively elastic. Also, the dual system facilitates identification of those who are physically but not mentally qualified.

A man's military occupational specialty is determined by his physical profile, the AFQT, and the Army Classification Battery. This last factor is a series of tests given at the Reception Center and measures specific aptitudes, knowledge, and skills.

The most important change in induction policies since World War II is with respect to those formerly classified as "limited service." This term has been replaced by physical category C but there are no restrictions to the induction of men in this category as there had been for "limited service" personnel.

Dr. Karpinos presents a distribution of inductees by jointly considered physical category and mental group for a recent period, August, 1950 through June, 1951. The largest proportion (28.1 per cent) is for the A-IV group. A and IV separately also have the largest total proportions with 75.6 per cent and 36.0 per cent, respectively.

As already noted, "physical categories" B and C are those in which the lowest ratings in the PULHES profile are, respectively, 2 and 3. Dr. Karpinos presents figures to show the relative importance of the various PULHES factors in accounting for presence of the inductee in physical categories B and C. The factor E (eyes) stood first as the reason for assignment to both B and C. For physical category B the factors were arranged as follows by order of magnitude: E, L, P, S, H, and U. For category C, it was E, P, L, S, U, and H. By color, the most limiting factor was E for whites and L (lower extremities) for Negroes. Although the age-range considered was narrow, the proportion of inductees qualifying for physical

category A was highest (79 per cent) for the youngest (ages 19-20) and lowest (70 per cent) for the oldest (ages 23-25).

MARILYN SCHWARTZ ARON

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HUNGRY PEOPLE AND EMPTY LANDS¹

THIS essay by the past director of demographic research in UNESCO (at present University Professor of Economics in the Maharaja Sayajirao University of Baroda, India) is a lucid, impassioned if not occasionally alarmist, plea for a world population policy. Chandrasekhar sketches the now-familiar pessimistic picture of two-thirds of the world's population increasing rapidly in an area of extreme congestion and low level of living and one-third of the world's population possessing the highest levels of living and the greatest room for expansion while in or approaching the stationary phase of population growth. The rapid population increase in such areas as Japan, China, and India only serves to increase the existing imbalance of the present distribution of the world's wealth. Moreover, the whole situation is further seriously aggravated by "man's blind, insidious, unknowing war on nature" which has resulted in soil erosion and depletion of natural resources. These processes, although occurring everywhere in various degrees, are most evident in precisely those countries having the greatest population pressure. Chandrasekhar argues that these combined factors of overpopulation and the mismanagement and abuse of natural resources are essential elements in current international tensions and, if allowed to go unchecked, will very likely lead to World War III. A world population policy built upon the following five objectives is the author's remedial program. They are (1) the grant of political freedom to all colonial peoples; (2) the universal adoption of birth control; (3) planned international migration (Chandrasekhar visualizes the organization of an International Migration Authority which would promote migration, for example, from the overpopulated areas of Asia

¹ Chandrasekhar, S.: *HUNGRY PEOPLE AND EMPTY LANDS*. Indian Institute for Population Studies, Baroda, India, 1952, 306 pages, \$3.50.

to the underpopulated islands in the Pacific, such as Borneo); (4) large-scale and rapid industrialization; and (5) intensive agricultural development. The complexity of each of these plans is discussed at some length in the book and no doubt the author would agree that such a program is anything but simple. Nevertheless, it seems to this reviewer that the author is so imbued with the dire urgency of the situation that he tends to repress considerations of the problems inherent in the implementation of such a program. In brief, it would appear from the point of view of practical politics that the prerequisites for the implementation of the author's objectives place him in the unhappy dilemma of presupposing the very condition he is trying to achieve—world peace. This is not intended to suggest, however, that these very real problems he elucidates can for long be ignored. Sooner or later they will force themselves on the attention of the world and, if the author's diagnosis is correct, the alternative to collective action in at least some approach to a world population policy is indeed "a grim one."

CHARLES F. WESTOFF

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THE POPULATION COUNCIL FELLOWSHIP PROGRAM

A NEW organization, The Population Council, Inc., has recently been established as a non-profit corporation in order to encourage research and education concerning the relationship of the world's population to its material and cultural resources.

The Council plans to study the problems of the increasing population of the world, to support research, and to make known the results of such research. It will serve as a center for exchange of facts and information on population questions and cooperate with individuals and institutions having similar interests.

The trustees of The Council are Frank G. Boudreau, Detlev W. Bronk, Karl T. Compton, Frank W. Notestein, Frederick Osborn, Thomas Parran, John D. Rockefeller, III, and Lewis L. Strauss.

The Council does not plan to conduct research or educational activities with its own staff. It has already made a small number of research grants to universities and other established organizations, and has established a number of fellowships for the training of students in the field of population.

The purpose of The Council's fellowship program is to assist in the advanced training in the study of population of students in the social and natural sciences at the predoctoral or postdoctoral levels. The Council is planning to grant approximately six fellowships (for study in the United States and elsewhere) during the academic year 1954-1955, to be divided between students from the United States and from other countries. Fellows will normally receive support for full-time work for a period of about one year. The basic stipend at the rate of \$2,500 per year may be supplemented to provide for maintenance of dependents, and especially in the case of foreign students, for travel or exceptional expenses. It may be diminished to take account of lesser needs or partial support from other sources. Somewhat larger stipends may be granted to postdoctoral than to predoctoral fellows. Preference will be given to candidates who are not over forty years of age.

For information or application forms relating to this program, inquiries should be addressed to Mr. Frederick Osborn, Executive Vice-President, The Population Council, 230 Park Avenue, New York 17, N. Y. Applications for fellowships for the academic year 1954-1955 should be received before February 1, 1954.

FREDERICK OSBORN



